

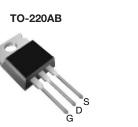
Vishay Siliconix

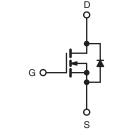
BoHS

COMPLIANT

Power MOSFET

PRODUCT SUMMARY					
V _{DS} (V)	200				
R _{DS(on)} (Ω)	$V_{GS} = 10 V$	0.18			
Q _g (Max.) (nC)	70				
Q _{gs} (nC)	13				
Q _{gd} (nC)	39				
Configuration	Single				





N-Channel MOSFET

FEATURES

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- · Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220AB package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 W. The low thermal resistance and low package cost of the TO-220AB contribute to its wide acceptance throughout the industry.

ORDERING INFORMATION	
Package	TO-220AB
Lead (Pb)-free	IRF640PbF
	SiHF640-E3
SnPb	IRF640
	SiHF640

ABSOLUTE MAXIMUM RATINGS (T C	= 25 °C, unl	ess otherwis	se noted)			
PARAMETER			SYMBOL	LIMIT	UNIT	
Drain-Source Voltage			V _{DS}	200	N	
Gate-Source Voltage			V _{GS}	± 20	- V	
Continuous Drain Current	V _{GS} at 10 V	T _C = 25 °C	- I _D	18		
		T _C = 100 °C		11	А	
Pulsed Drain Current ^a			I _{DM}	72		
Linear Derating Factor				1.0	W/°C	
Single Pulse Avalanche Energy ^b			E _{AS}	580	mJ	
Repetitive Avalanche Current ^a			I _{AR}	18	A	
Repetitive Avalanche Energy ^a			E _{AR} 13		mJ	
Maximum Power Dissipation	T _C =	25 °C	P _D 125		W	
Peak Diode Recovery dV/dt ^c			dV/dt	5.0	V/ns	
Operating Junction and Storage Temperature Range			T _J , T _{stg}	- 55 to + 150		
Soldering Recommendations (Peak Temperature)	for 10 s			300 ^d	- °C	
Mounting Torque	6-32 or M3 screw			10	lbf ⋅ in	
				1.1	N · m	

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. $V_{DD} = 50 \text{ V}$, starting $T_J = 25 \text{ °C}$, L = 2.7 mH, $R_g = 25 \Omega$, $I_{AS} = 18 \text{ A}$ (see fig. 12). c. $I_{SD} \le 18 \text{ A}$, dI/dt $\le 150 \text{ A/}\mu\text{s}$, $V_{DD} \le V_{DS}$, $T_J \le 150 \text{ °C}$.

d. 1.6 mm from case.

* Pb containing terminations are not RoHS compliant, exemptions may apply

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Maximum Junction-to-Ambient $R_{m,jA}$ - 62 Case-to-Sink, Flat, Greased Surface $R_{p,CS}$ 0.50 - SPECIFICATIONS ($T_J = 25$ °C, unless otherwise noted) TST Maximum Junction-to-Case (Drain) Resc 0.50 - 1.0 SPECIFICATIONS ($T_J = 25$ °C, unless otherwise noted) Test construction to the set of the	THERMAL RESISTANCE RATI	NGS							
Case-to-Sink, Flat, Greased Surface P_{HCS} 0.50 \cdot $^{\circ}$ C/W Maximum Junction-to-Case (Drain) R_{HJC} $ 1.0$ $^{\circ}$ C/W SPECIFICATIONS (T _J = 25 °C, unless otherwise noted) TEST CONDITIONS Min. TYP. MAX. UN Static Drain-Source Breakdown Voltage V_{DS} $V_{CS} = 0$ V, $I_0 = 250 \ \mu A$ 2.0 $ V_{VS}$ Gate-Source Intreshold Voltage V_{DS} $V_{CS} = 420 \ V$ $ 2.0$ $ 4.0$ V_{VS} Gate-Source Leakage I.ass $V_{CS} = 200 \ V$, $V_{SS} = 0 \ V$, $V_{SS} = 0 \ V$ $ 2.5 \ \mu$ V_{VS} Zaro Gate Voltage Drain Current I.bss $V_{OS} = 100 \ V$, $V_{SS} = 0 \ V$, $V_{SS} = 0 \ V$, $V_{SS} = 10 \ V$ $I_0 = 11 \ A^b$ $ 0.18 \ \Omega$ Drain-Source On-State Resistance $P_{DS(er)}$ $V_{OS} = 50 \ V$, $V_{SS} = 10 \ V$ $I_0 = 11 \ A^b$ $ 0.13 \ \Omega$ Input Capacitance C_{Ses} $V_{CS} = 10 \ V$ $I_0 = 18 \ A, V_{DS} = 160 \ V, I_0 = 18 \ A, V_{DS} = 160 \ V, I_0 = 18 \ A, V_{DS} = 160 \ V, I_0 = 18 \ A, V_{DS} = 100 \ V, $	PARAMETER	SYMBOL	TYP.		MAX.		UNIT		
Maximum Junction-to-Case (Drain) Revice - 1.0 SPECIFICATIONS ($T_j = 25$ °C, unless otherwise noted) PARAMETER SYMBOL TEST CONDITIONS Min. TYP. MAX. UN SPECIFICATIONS ($T_j = 25$ °C, unless otherwise noted) PARAMETER SYMBOL TEST CONDITIONS Min. TYP. MAX. UN Gale-Source Breakdown Voltage Vogs TJ Reference to 25 °C, 15 = 1 mA 2.0 - 4.0 V////////////////////////////////////	Maximum Junction-to-Ambient	R _{thJA}							
$\begin{aligned} \begin{array}{c c c c c c c c c c c c c c c c c c c $	Case-to-Sink, Flat, Greased Surface	R _{thCS}					°C/W		
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Maximum Junction-to-Case (Drain)	R _{thJC}	- 1.0						
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		•	·						
Static VDS	SPECIFICATIONS ($T_J = 25 \text{ °C}$, u	Inless otherw	ise noted)						
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	PARAMETER	SYMBOL	TEST	CONDITI	ONS	MIN.	TYP.	MAX.	UNIT
$\begin{split} & V_{DS} \mbox{ Temperature Coefficient} & \Delta V_{DS}/J_{J} & Reference to 25 \ ^{\circ}C, \ I_{D} = 1 \ mA & - & 0.29 & - & V/2 \\ & Gate-Source Threshold Voltage & V_{GS(Ph)} & V_{DS} = V_{GS, \ I_{D}} = 250 \ \muA & 2.0 & - & 4.0 & V \\ & Gate-Source Leakage & I_{GSS} & V_{GS} = 2 \ 20 \ V, \ V_{GS} = 0 \ V & - & - & 21 \ 100 \ mV \\ & V_{DS} = 200 \ V, \ V_{GS} = 0 \ V & - & - & 250 \ \muV \\ & V_{DS} = 100 \ V, \ V_{GS} = 0 \ V & - & - & 250 \ \muV \\ & V_{DS} = 100 \ V, \ V_{GS} = 0 \ V, \ V_{GS} = 0 \ V & - & - & 250 \ \muV \\ & V_{DS} = 100 \ V, \ V_{GS} = 0 \ V, \ V_{GS}$	Static		•						
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0$	V, I _D = 2	50 µA	200	-	-	V
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	Reference t	o 25 °C,	I _D = 1 mA	-	0.29	-	V/°C
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V	_{GS} , I _D = 2	50 µA	2.0	-	4.0	V
Zero Gate Voltage Drain Current IDSS VDS = 160 V, VGS = 0 V, TJ = 125 °C - - 250 μ Drain-Source On-State Resistance RDS(on) VGS = 10 V Ib = 11 Ab - - 0.18 0.0 Forward Transconductance gfs VDS = 50 V, Ib = 11 Ab 6.7 - - 0.18 0.0 Dynamic Input Capacitance Ciss VDS = 50 V, Ib = 11 Ab 6.7 - - 0.18 0.0 Output Capacitance Coss VDS = 50 V, Ib = 11 Ab 6.7 - - 0.1300 - - 1300 - - 1300 - - 1300 - - 1300 - - 1300 - - 1300 - - 130 - - 140 - - 130 - - 141 - - 141 - - 141 - - 141 - - 141 - - 141 - -	Gate-Source Leakage	I _{GSS}	V _G	s = ± 20 '	V	-	-	± 100	nA
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$					-	-	25	•	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Zero Gate voltage Drain Current	IDSS			T _J = 125 °C	-	-	250	μA
DynamicInput CapacitanceCiss $V_{GS} = 0.V$, $V_{DS} = 25.V$, f = 1.0 MHz, see fig. 5-1300-Output CapacitanceCross $rage = 0.V$, $V_{DS} = 25.V$, f = 1.0 MHz, see fig. 5430-plReverse Transfer CapacitanceCross $rage = 0.V$, $V_{DS} = 25.V$, f = 1.0 MHz, see fig. 51300Total Gate Charge Q_{gg} Q_{gg} $V_{GS} = 10.V$ $l_{b} = 18.A, V_{DS} = 160.V$, see fig. 6 and 13b70Gate-Drain Charge Q_{gd} $V_{GS} = 10.V$ $l_{b} = 18.A, V_{DS} = 160.V$, see fig. 6 and 13b39Turn-On Delay Time $t_{d(onf)}$ r_{r} $V_{DD} = 100.V, I_{D} = 18.A, See fig. 10^{b}$ 14-Turn-Off Delay Time $t_{d(off)}$ r_{r} r_{r} r_{r} -4.5-Fall Time t_{r} r_{r} r_{r} -4.5Internal Drain Inductance L_{D} Between lead, 6 mm (0.25") from package and center of die contact18Pulsed Diode Forward Current* I_{SM} MOSFET symbol showing the integral reverse $p - n$ junction diode1818Pulsed Diode Forward Current* I_{SM} $T_{J} = 25 °C$, $I_{F} = 18.A, dI/dt = 100.A/\mus^{b}$ 2.0VBody Diode Reverse Recovery Time t_{rr} $T_{J} = 25 °C$, $I_{F} = 18.A, dI/dt = 100.A/\mus^{b}$ <td>Drain-Source On-State Resistance</td> <td>R_{DS(on)}</td> <td>V_{GS} = 10 V</td> <td>١</td> <td>_D = 11 A^b</td> <td>-</td> <td>-</td> <td>0.18</td> <td>Ω</td>	Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	١	_D = 11 A ^b	-	-	0.18	Ω
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Forward Transconductance	9 _{fs}	V _{DS} = 5	0 V, I _D =	11 A ^b	6.7	-	-	S
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Dynamic							I	1
Output Capacitance C_{oss} $V_{DS} = 25 \text{ V}, \\ f = 1.0 \text{ MHz}, see fig. 5$ $ 430$ $-$ plReverse Transfer Capacitance C_{rss} $f = 1.0 \text{ MHz}, see fig. 5$ $ 430$ $-$ plReverse Transfer Capacitance C_{rss} $V_{DS} = 10 \text{ V}$ $I_D = 18 \text{ A}, V_{DS} = 160 \text{ V}, see fig. 6 and 13^{b}$ $ 70$ Gate-Source Charge Q_{gd} $V_{GS} = 10 \text{ V}$ $I_D = 18 \text{ A}, V_{DS} = 160 \text{ V}, see fig. 6 and 13^{b}$ $ 39$ Turn-On Delay Time $t_{d(on)}$ $V_{DD} = 100 \text{ V}, I_D = 18 \text{ A}, R_g = 9.1 \Omega, R_D = 5.4 \Omega, see fig. 10^{b}$ $ 4.5$ $-$ Fall Time t_f $V_{DD} = 100 \text{ V}, I_D = 18 \text{ A}, See fig. 10^{b}$ $ 4.5$ $ -$ Internal Drain Inductance L_D Between lead, 6 mm (0.25") from package and center of die contact $ 7.5$ $ -$ Drain-Source Body Diode Characteristics V_{SD} $T_J = 25 ^{\circ}C$, $I_S = 18 \text{ A}, V_{GS} = 0 \text{ Vb}$ $ -$ Body Diode Forward Current* I_S $MOSFET$ symbol showing the integral reverse p - n junction diode $ -$ </td <td>Input Capacitance</td> <td>C_{iss}</td> <td colspan="2" rowspan="3">$V_{DS} = 25 V$,</td> <td>-</td> <td>1300</td> <td>-</td> <td rowspan="3">pF</td>	Input Capacitance	C _{iss}	$V_{DS} = 25 V$,		-	1300	-	pF	
Reverse Iranster Capacitance C_{rss} -130-Total Gate Charge Q_g Gate-Source Charge Q_{gs} Gate-Drain Charge Q_{gd} Gate-Drain Charge Q_{gd} Turn-On Delay Time $t_{d(on)}$ Rise Time t_r Turn-Off Delay Time $t_{d(off)}$ Fall Time t_r Turn-Off Delay Time $t_{d(off)}$ Fall Time t_r Internal Drain Inductance L_D Between lead, 6 mm (0.25°) from package and center of die contactInternal Source Inductance L_S MOSFET symbol showing the integral reverse $p - n$ junction diodePulsed Diode Forward Currenta I_{SM} Mody Diode Reverse Recovery Time t_{rr} Body Diode Reverse Recovery Charge Q_{rr} Turn-Store R	Output Capacitance	C _{oss}			-	430	-		
$ \begin{array}{c c c c c c c } \hline Total Gate Charge & Q_g & \\ \hline Gate-Source Charge & Q_{gd} & \\ \hline Gate-Drain Charge & Q_{gd} & \\ \hline U_{GS} = 10 \ V & \\ \hline U_{SS} = 10 \ V & \\ \hline See fig. 6 and 13^b & \\ \hline I_{D} = 18 \ A, \ V_{DS} = 160 \ V, \\ \hline See fig. 6 and 13^b & \\ \hline I_{O} & - & 13 & \\ \hline I_{O} & - & 39 & \\ \hline I_{O} & - & 39 & \\ \hline I_{O} & - & 39 & \\ \hline I_{O} & - & - & 39 & \\ \hline I_{O} & - & - & 39 & \\ \hline I_{O} & - & - & 39 & \\ \hline I_{O} & - & - & 39 & \\ \hline I_{O} & - & - & 39 & \\ \hline I_{O} & - & - & 14 & - & \\ \hline I_{O} & - & - & 14 & - & \\ \hline I_{O} & - & - & 14 & - & \\ \hline I_{O} & - & - & 14 & - & \\ \hline I_{O} & - & - & 14 & - & \\ \hline I_{O} & - & - & 14 & - & \\ \hline I_{O} & - & - & 4.5 & - & \\ \hline I_{O} & - & - & 36 & - & \\ \hline I_{O} & - & - & 36 & - & \\ \hline I_{O} & - & - & 36 & - & \\ \hline I_{O} & - & - & 36 & - & \\ \hline I_{O} & - & - & - & - & 18 \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & \\ \hline I_{O} & I_{O} & I_{O} $	Reverse Transfer Capacitance	C _{rss}			-	130	-		
Gate-Source Charge d_{gs} $V_{GS} = 10$ 2 see fig. 6 and 13b 2 2 2 1 1 1 2 2 1 1 1 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 2 2 1 1 2 <td>Total Gate Charge</td> <td>Qg</td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td>70</td> <td></td>	Total Gate Charge	Qg				-	-	70	
Gate-Drain Charge Q_{gd} 39Turn-On Delay Time $t_{d(on)}$ Rise Time t_r Turn-Off Delay Time $t_{d(off)}$ Fall Time t_r Fall Time t_f Internal Drain Inductance L_D Between lead, 6 mm (0.25") from package and center of die contact-Internal Source Inductance L_S MOSFET symbol showing the integral reverse $p - n$ junction diode-Integral Proverse Polsed Diode Forward CurrentaIs N_{SD} Moster Serverse Recovery Time t_{rr} $T_J = 25 °C, I_S = 18 A, V_{GS} = 0 V^b$ - $T_J = 25 °C, I_F = 18 A, dl/dt = 100 A/\mus^b$ - 300 610 ne 300 610 ne 300 610 ne 300 7.1 μC 300 610 ne 100 100 100 100 100 100 100 100 100 100 100 100 100 100 <td< td=""><td>Gate-Source Charge</td><td>Q_{gs}</td><td colspan="2"></td><td></td><td>-</td><td>-</td><td>13</td><td>nC</td></td<>	Gate-Source Charge	Q _{gs}				-	-	13	nC
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-Drain Charge	Q _{gd}		3001	ig. 6 and 16	-	-	39	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Turn-On Delay Time	t _{d(on)}				-	14	-	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Rise Time		$V_{DD} = 100 \text{ V}, \text{ I}_D = 18 \text{ A},$ $\text{R}_g = 9.1 \ \Omega, \text{ R}_D = 5.4 \ \Omega, \text{ see fig. } 10^{\text{b}}$		18 A.	-	51	-	1
Internal Drain Inductance L_D Between lead, 6 mm (0.25") from package and center of die contact-4.5-nHInternal Source Inductance L_S L_S MOSFET symbol showing the integral reverse $p - n$ junction diode-7.5-18Pulsed Diode Forward Currenta I_SM MOSFET symbol showing the integral reverse $p - n$ junction diode18ABody Diode Voltage V_{SD} $T_J = 25 ^\circ C$, $I_S = 18 A$, $V_{GS} = 0 V^b$ 2.0VBody Diode Reverse Recovery Time t_{rr} $T_J = 25 ^\circ C$, $I_F = 18 A$, dl/dt = 100 A/µsb-3.47.1µd	Turn-Off Delay Time	t _{d(off)}			-	45	-	ns	
Internal Drain Hubblan HubblanLD6 mm (0.25") from package and center of die contact-4.3Internal Source InductanceLS6 mm (0.25") from package and center of die contact-7.5Drain-Source Body Diode CharacteristicsContinuous Source-Drain Diode CurrentIsMOSFET symbol showing the integral reverse p - n junction diode18APulsed Diode Forward CurrentaIsMOSFET symbol showing the integral reverse p - n junction diode72ABody Diode VoltageVSDTJ = 25 °C, IS = 18 A, VGS = 0 Vb2.0VBody Diode Reverse Recovery TimetrrTJ = 25 °C, IF = 18 A, dI/dt = 100 A/µsb-3.47.1µ0	Fall Time	t _f			-	36	-		
Internal Source InductanceLSPackage and center of die contactImage: Content of showing the integral reverse p - n junction diode-7.5-Drain-Source Body Diode CharacteristicsContinuous Source-Drain Diode CurrentISMOSFET symbol showing the integral reverse p - n junction diode18APulsed Diode Forward CurrentaISMT_J = 25 °C, I_S = 18 A, V_{GS} = 0 V^b72ABody Diode VoltageV_{SD}T_J = 25 °C, I_S = 18 A, V_{GS} = 0 V^b2.0VBody Diode Reverse Recovery Timetrr T_J = 25 °C, I_F = 18 A, dl/dt = 100 A/µs^b-3.00610ns-3.47.1µ014	Internal Drain Inductance	L _D	6 mm (0.25") from a center of		-	4.5	-	nH	
Continuous Source-Drain Diode CurrentIsMOSFET symbol showing the integral reverse p - n junction diode18APulsed Diode Forward CurrentaIsmIsmTJ = 25 °C, Is = 18 A, VGS = 0 Vb72VBody Diode VoltageVspTJ = 25 °C, Is = 18 A, VGS = 0 Vb2.0VBody Diode Reverse Recovery TimetrrTJ = 25 °C, Is = 18 A, dI/dt = 100 A/µsb-300610nsBody Diode Reverse Recovery ChargeQrr3.47.1µ0	Internal Source Inductance	L _S			-	7.5	-		
Continuous Source-Drain Diode CurrentIs is showing the integral reverse p - n junction diode18APulsed Diode Forward CurrentaIsmIsmp - n junction diode72ABody Diode VoltageVspT_J = 25 °C, Is = 18 A, VGs = 0 Vb2.0VBody Diode Reverse Recovery TimetrrT_J = 25 °C, Is = 18 A, dl/dt = 100 A/µsb-300610nsBody Diode Reverse Recovery ChargeQrr3.47.1µ0	Drain-Source Body Diode Characteristic	cs							
Pulsed Diode Forward CurrentaI I SMIntegral reverse p - n junction diode72Body Diode VoltageV SDT T 225 °C, I S = 18 A, V GS = 0 Vb72Body Diode Reverse Recovery Timet rrT T J = 25 °C, I F = 18 A, dI/dt = 100 A/µsb2.0VBody Diode Reverse Recovery ChargeQ rrT T J = 25 °C, I F = 18 A, dI/dt = 100 A/µsb-3.00610ns	Continuous Source-Drain Diode Current	۱ _S	showing the		-	-	18	A	
Body Diode Reverse Recovery Time t_{rr} $T_J = 25 \ ^{\circ}C$, $I_F = 18 \ A$, $dI/dt = 100 \ A/\mu s^b$ - 300 610 nsBody Diode Reverse Recovery Charge Q_{rr} $T_J = 25 \ ^{\circ}C$, $I_F = 18 \ A$, $dI/dt = 100 \ A/\mu s^b$ - 3.4 7.1 μC	Pulsed Diode Forward Current ^a	I _{SM}				-	-		72
$T_{J} = 25 \text{ °C}, I_{F} = 18 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}^{b}$ Body Diode Reverse Recovery Charge Q_{rr} $T_{J} = 25 \text{ °C}, I_{F} = 18 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}^{b}$ $- 3.4 \text{ 7.1} \mu\text{C}$	Body Diode Voltage	V _{SD}	$T_{J} = 25 \text{ °C}, I_{S} = 18 \text{ A}, V_{GS} = 0 \text{ V}^{b}$			-	-	2.0	V
Body Diode Reverse Recovery Charge Q _{rr} - 3.4 7.1 µ0	Body Diode Reverse Recovery Time	t _{rr}	- $T_J = 25 \text{ °C}, I_F = 18 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}^{b}$		-	300	610	ns	
Forward Turn-On Time ton Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D)	Body Diode Reverse Recovery Charge	Q _{rr}			-	3.4	7.1	μC	
	Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn			-on is dor	minated b	y L _S and	L _D)

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Pulse width \leq 300 µs; duty cycle \leq 2 %.

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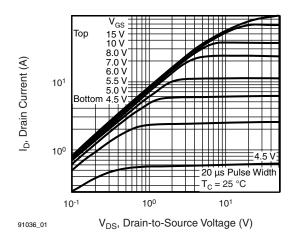


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

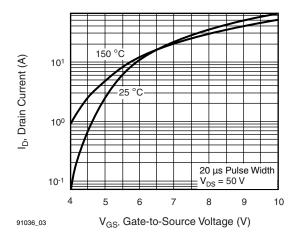


Fig. 3 - Typical Transfer Characteristics

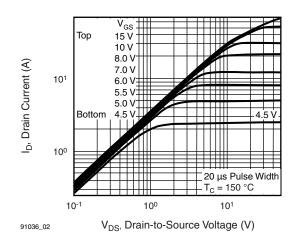


Fig. 2 - Typical Output Characteristics, T_C = 150 $^\circ C$

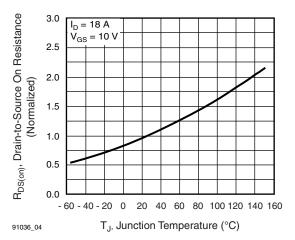


Fig. 4 - Normalized On-Resistance vs. Temperature

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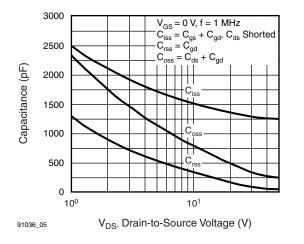


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

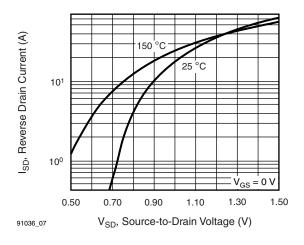


Fig. 7 - Typical Source-Drain Diode Forward Voltage

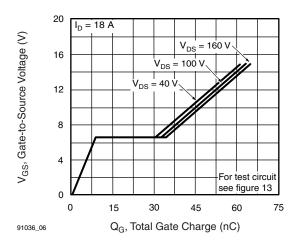


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

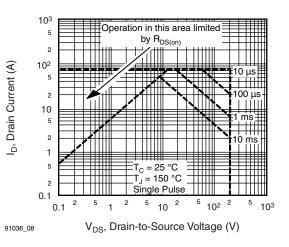


Fig. 8 - Maximum Safe Operating Area

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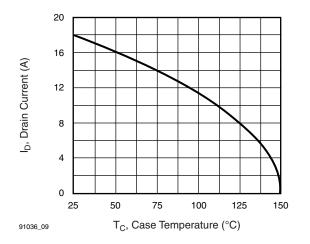


Fig. 9 - Maximum Drain Current vs. Case Temperature

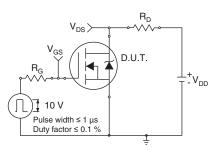


Fig. 10a - Switching Time Test Circuit

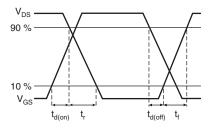


Fig. 10b - Switching Time Waveforms

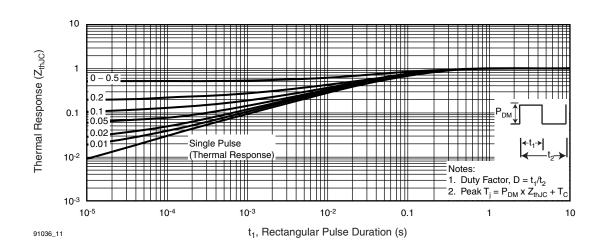


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

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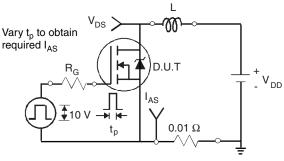


Fig. 12a - Unclamped Inductive Test Circuit

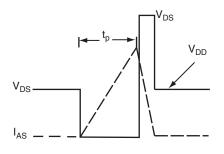


Fig. 12b - Unclamped Inductive Waveforms

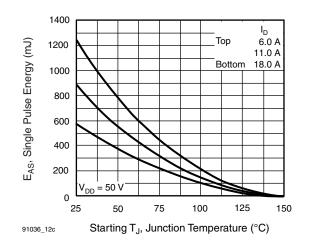


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

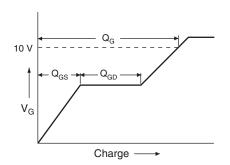


Fig. 13a - Basic Gate Charge Waveform

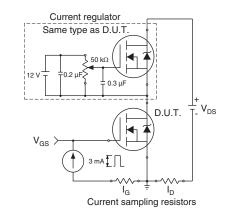
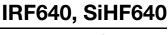


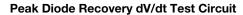
Fig. 13b - Gate Charge Test Circuit

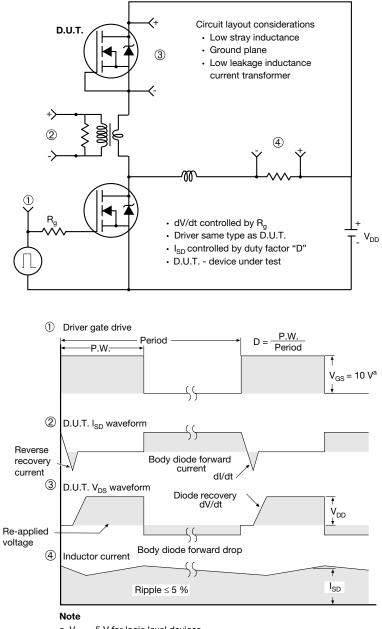
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a. V_{GS} = 5 V for logic level devices

Fig. 14 - For N-Channel

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