

RoHS Compliant Product  
A suffix of "-C" specifies halogen free

## DESCRIPTION

These miniature surface mount MOSFETs utilize high cell density process. Low R<sub>DS(on)</sub> assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are PWMDC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

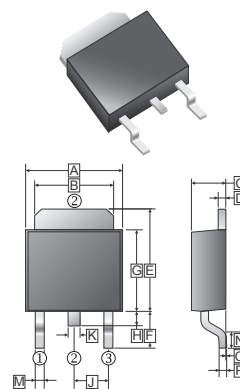
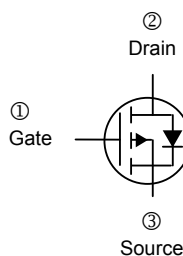
**TO-252(D-Pack)**

## FEATURES

- Low R<sub>DS(on)</sub> provides higher efficiency and extends battery life.
- Miniature TO-252 surface mount package saves board space.
- High power and current handling capability.
- Extended V<sub>GS</sub> range (±25) for battery pack applications.

## PRODUCT SUMMARY

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V <sub>DS</sub> (V)	R <sub>DS(on)</sub> m(Ω)	I <sub>D</sub> (A)
-60	49@V <sub>GS</sub> = -10V	28
	60@V <sub>GS</sub> = -4.5V	24



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.4	6.8	J	2.30	REF.
B	5.20	5.50	K	0.70	0.90
C	2.20	2.40	M	0.50	1.1
D	0.45	0.58	N	0.9	1.6
E	6.8	7.3	O	0	0.15
F	2.40	3.0	P	0.43	0.58
G	5.40	6.2			
H	0.8	1.20			

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V <sub>DS</sub>	-60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>a</sup>	I <sub>D</sub> @ T <sub>A</sub> =25°C	61	A
Pulsed Drain Current <sup>b</sup>	I <sub>DM</sub>	±40	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	-30	A
Total Power Dissipation <sup>a</sup>	P <sub>D</sub> @ T <sub>A</sub> =25°C	50	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 ~ 175	°C
THERMAL RESISTANCE RATINGS			
Maximum Thermal Resistance Junction-Ambient <sup>a</sup>	R <sub>θJA</sub>	50	°C / W
Maximum Thermal Resistance Junction-Case	R <sub>θJC</sub>	3.0	°C / W

Notes :

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature.

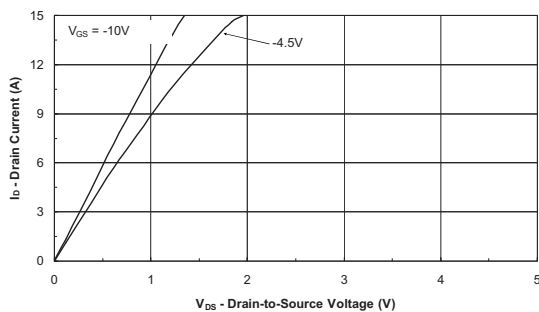
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	-1	-	-		$V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	-1	$\mu\text{A}$	$V_{DS} = -48\text{V}, V_{GS} = 0\text{V}$
		-	-	-10		$V_{DS} = -48\text{V}, V_{GS} = 0\text{V}, T_J = 55^\circ\text{C}$
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	-20	-	-	A	$V_{DS} = -5\text{V}, V_{GS} = -10\text{V}$
Drain-Source On-Resistance <sup>a</sup>	$R_{DS(ON)}$	-	-	49	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -28\text{A}$
		-	-	60		$V_{GS} = -4.5\text{V}, I_D = -24\text{A}$
Forward Transconductance <sup>a</sup>	$g_{fs}$	-	8	-	S	$V_{DS} = -15\text{V}, I_D = -28\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-	-1.2	V	$I_S = -2.5\text{A}, V_{GS} = 0\text{V}$
<b>Dynamic</b> <sup>b</sup>						
Total Gate Charge	$Q_g$	-	18	-	nC	$V_{DS} = -30\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -28\text{A}$
Gate-Source Charge	$Q_{gs}$	-	5	-		
Gate-Drain Charge	$Q_{gd}$	-	2	-		
Turn-on Delay Time	$T_{d(on)}$	-	8	-	nS	$V_{DD} = -30\text{V}$ $I_D = -1\text{A}$ $V_{GEN} = -10\text{V}$ $R_L = 30\ \Omega$ $R_G = 6\ \Omega$
Rise Time	$T_r$	-	10	-		
Turn-off Delay Time	$T_{d(off)}$	-	35	-		
Fall Time	$T_f$	-	12	-		

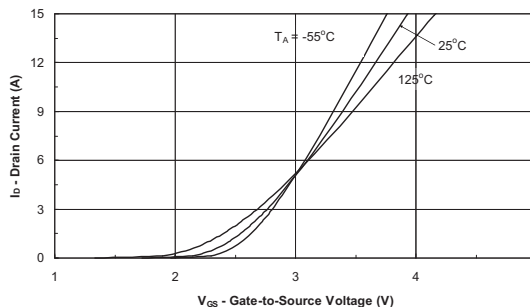
Notes

- Pulse test : Pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

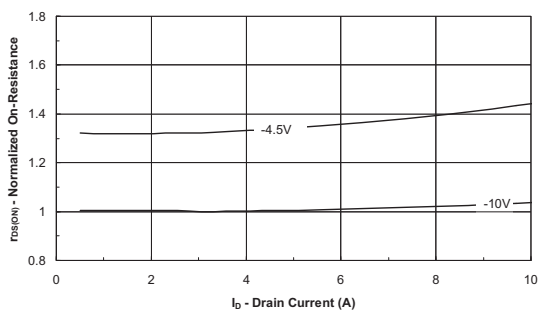
**CHARACTERISTIC CURVE**



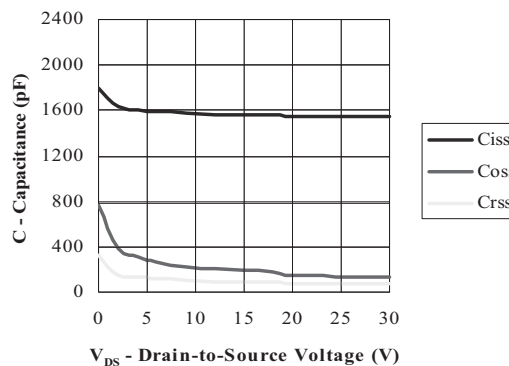
**Output Characteristics**



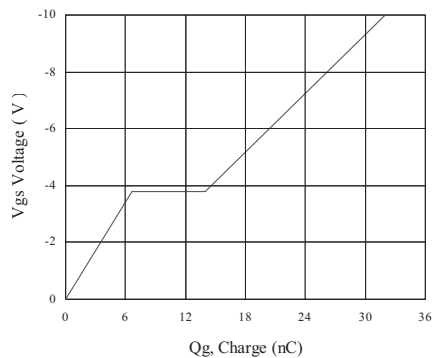
**Transfer Characteristics**



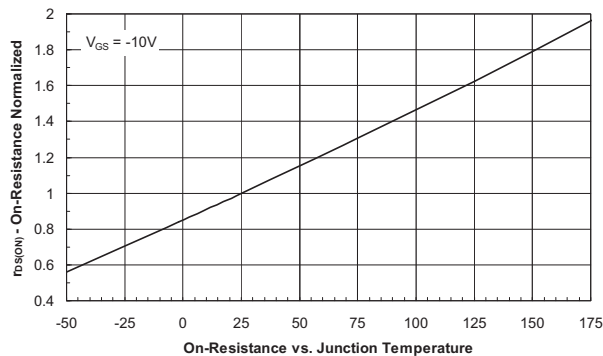
**On-Resistance vs. Drain Current**



**Capacitance**

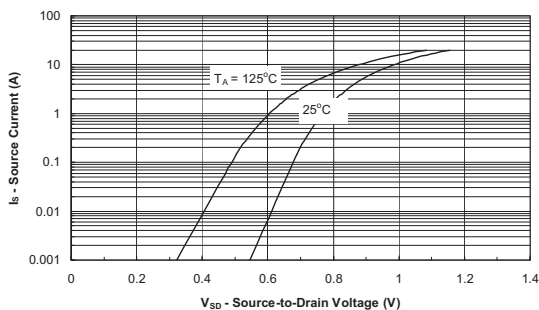


**Gate Charge**

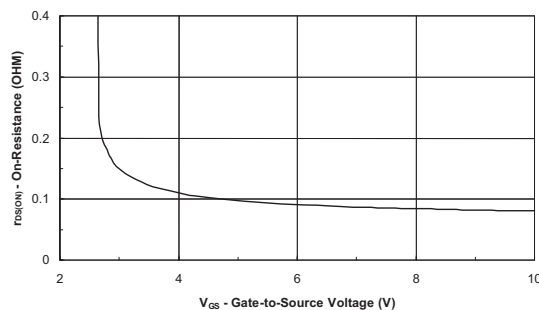
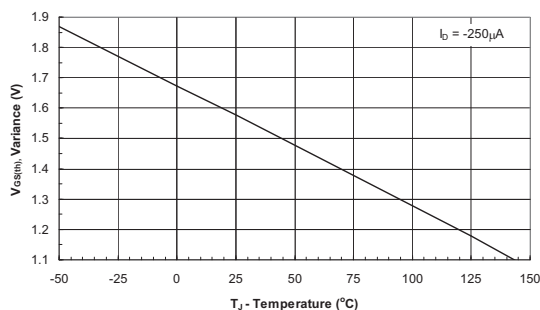


**On-Resistance vs. Junction Temperature**

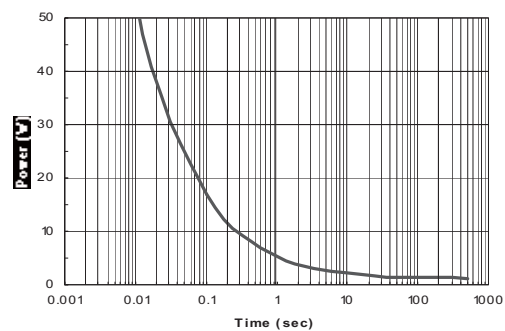
**CHARACTERISTIC CURVE**



Source-Drain Diode Forward Voltage

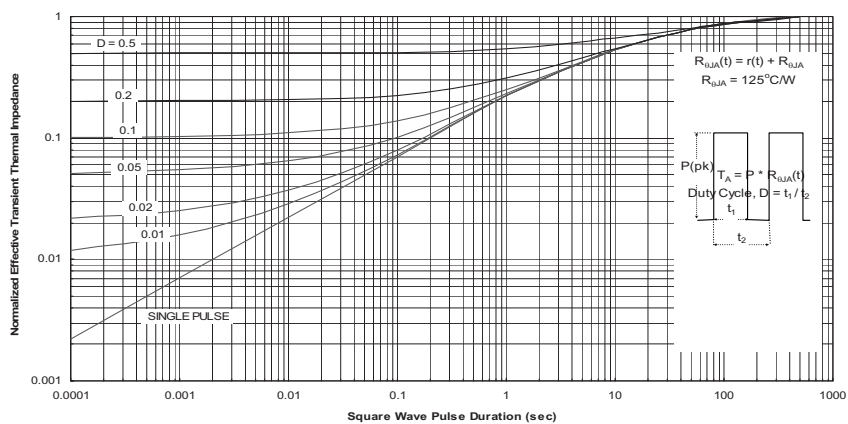


On-Resistance vs. Gate-to Source Voltage



Threshold Voltage

Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient