N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
100	0.0183 at V_{GS} = 10 V	60	48
	0.023 at V_{GS} = 8.0 V	53	

FEATURES

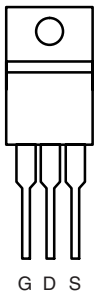
- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

RoHS COMPLIANT

APPLICATIONS

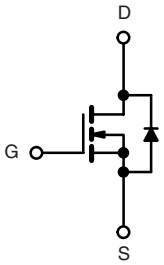
- Industrial
- Power Supply

TO-220AB



Top View

Ordering Information: SUP60N10-18P-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_C = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	60	A
	T_C = 70 °C		50	
Pulsed Drain Current		I_{DM}	100	
Avalanche Current		I_{AS}	45	
Single Avalanche Energy[a]	L = 0.1 mH	E_{AS}	101	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	150[b]	W
	T_A = 25 °C[c]		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Limit**	**Unit**
Junction-to-Ambient (PCB Mount)[c]	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	1.0	

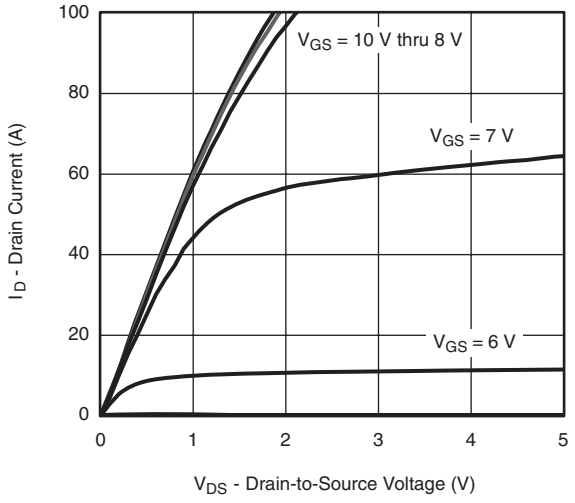
Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When Mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{DS} = 0 V, I_D = 250 µA	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.5		4.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V			1	µA
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 175 °C			250	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	50			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A		0.015	0.0183	Ω
		V_{GS} = 10 V, I_D = 15 A, T_J = 125 °C		0.027	0.033	
		V_{GS} = 8.0 V, I_D = 10 A		0.018	0.023	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 15 A		33		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz		2600		pF
Output Capacitance	C_{oss}			230		
Reverse Transfer Capacitance	C_{rss}			80		
Total Gate Charge[c]	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 50 A		48	75	nC
Gate-Source Charge[c]	Q_{gs}			16		
Gate-Drain Charge[c]	Q_{gd}			13		
Gate Resistance	R_g	f = 1 MHz	0.25	1.1	2.4	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 1.0 Ω I_D ≅ 50 A, V_{GEN} = 10 V, R_g = 1 Ω		12	20	ns
Rise Time[c]	t_r			10	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			18	35	
Fall Time[c]	t_f			8	15	
Drain-Source Body Diode Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				60	A
Pulsed Current	I_{SM}				100	
Forward Voltage[a]	V_{SD}	I_F = 15 A, V_{GS} = 0 V		0.85	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 50 A, dI/dt = 100 A/µs		80	120	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			4		A
Reverse Recovery Charge	Q_{rr}			160	240	nC

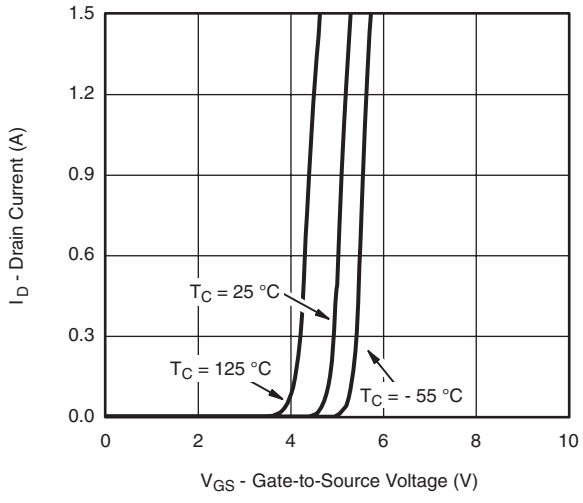
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

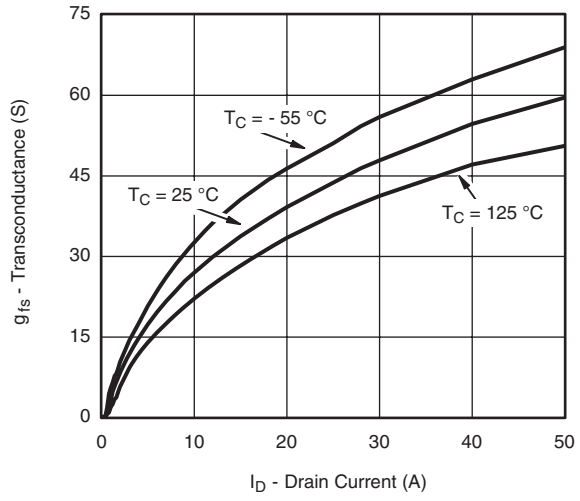
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



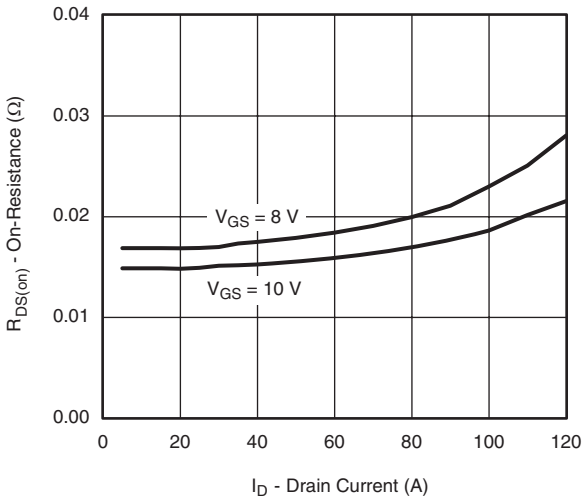
Output Characteristics



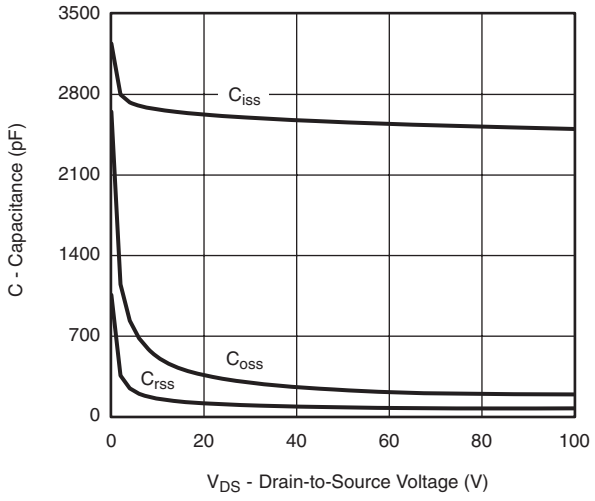
Transfer Characteristics



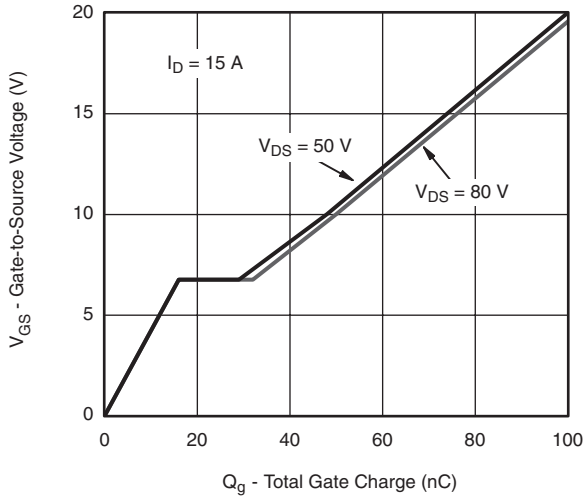
Transconductance



On-Resistance vs. Drain Current

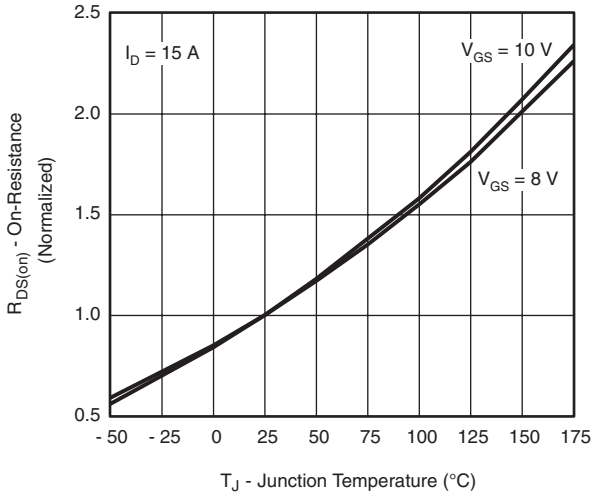


Capacitance

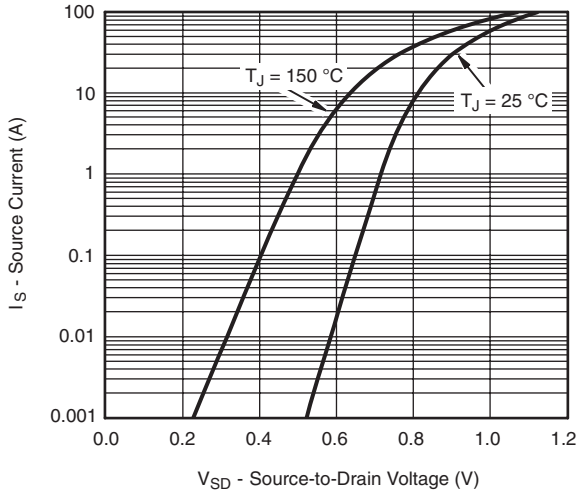


Gate Charge

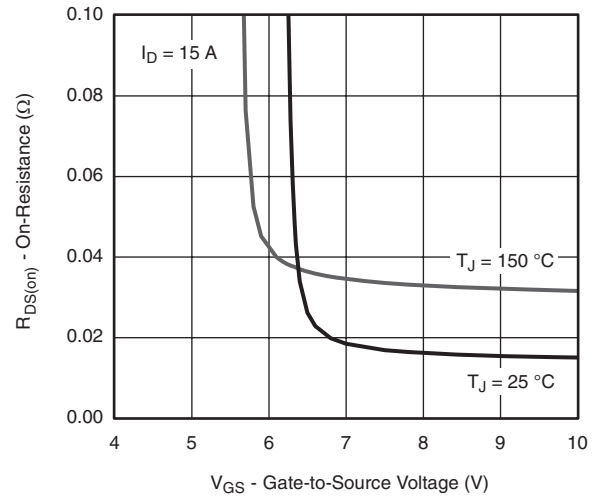
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



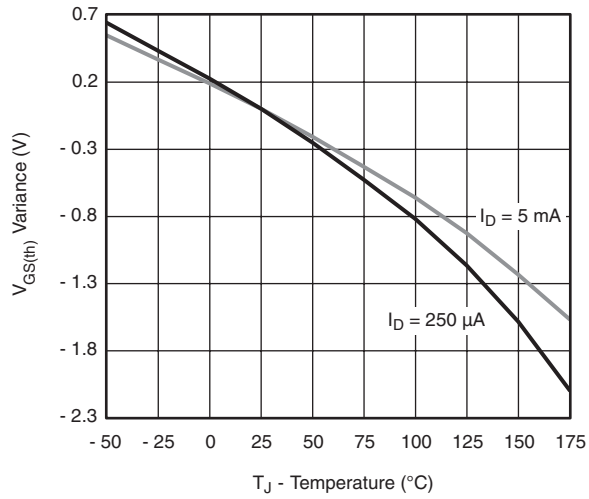
On-Resistance vs. Junction Temperature



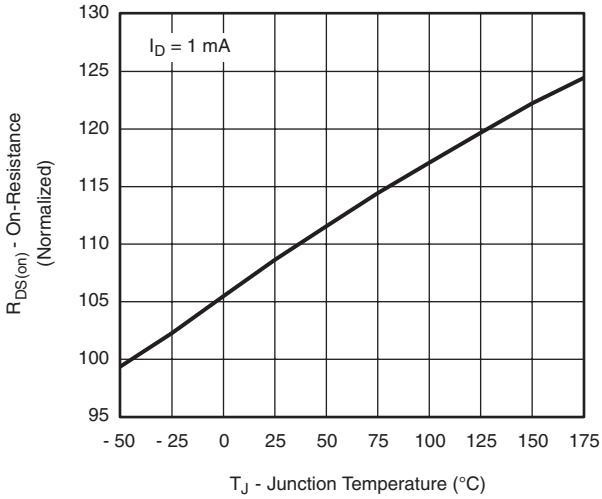
Source-Drain Diode Forward Voltage



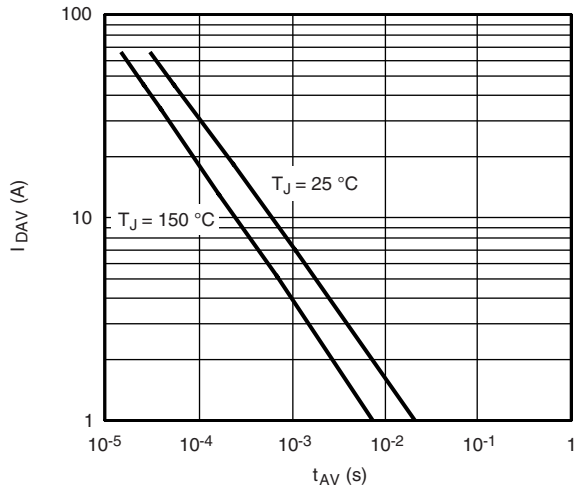
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

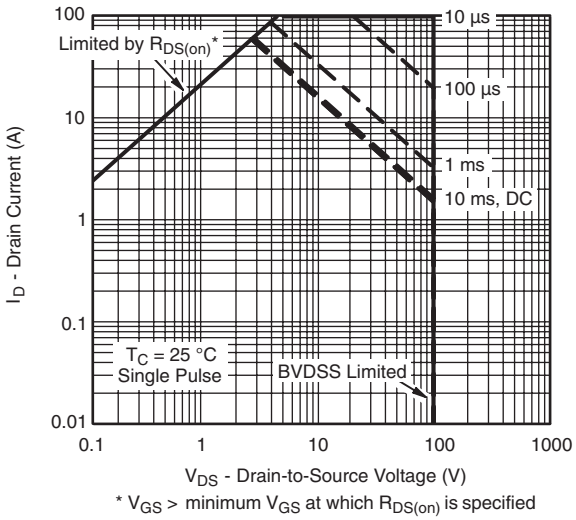


On-Resistance vs. Junction Temperature

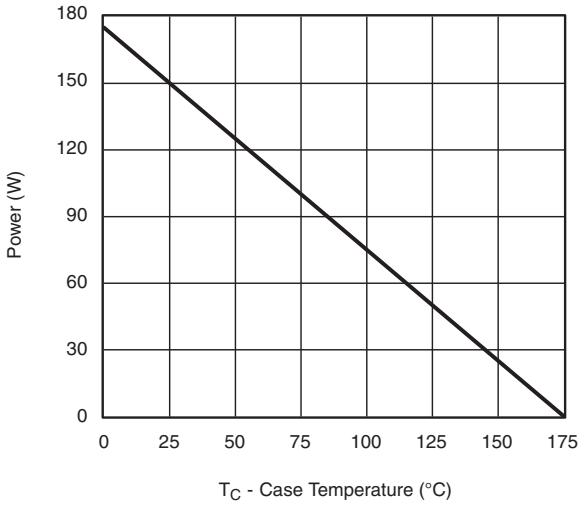


Avalanche Current vs. Time

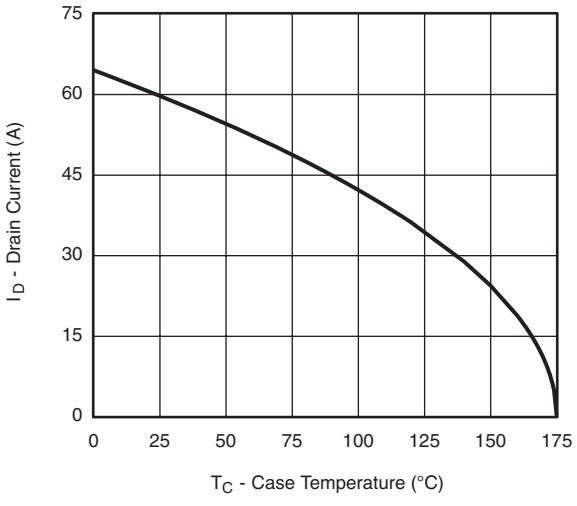
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Safe Operating Area



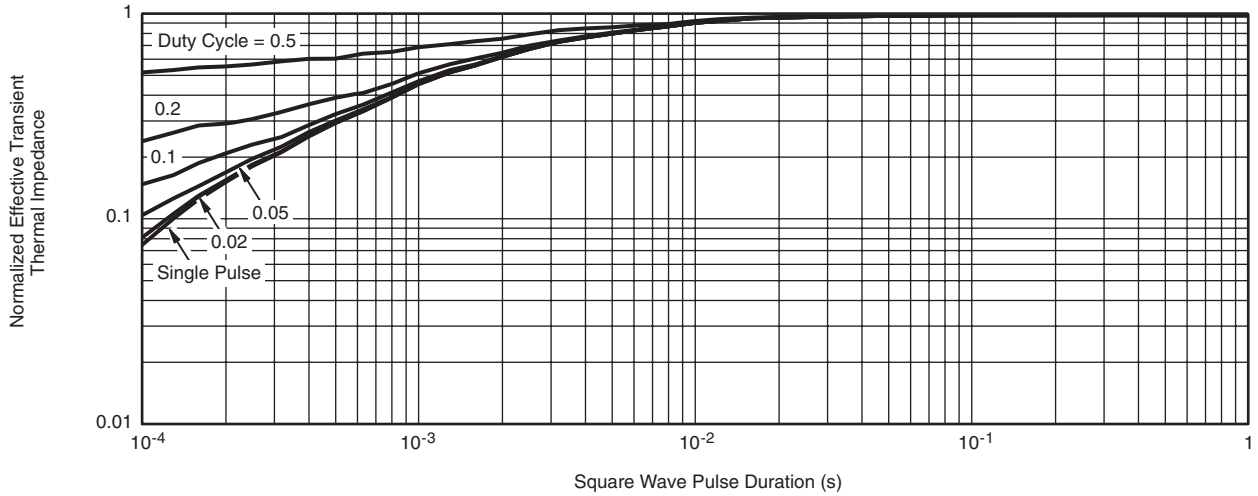
Power Derating, Junction-to-Case



Current Derating*

* The power dissipation P_D is based on $T_{J(max.)}$ = 175 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Case

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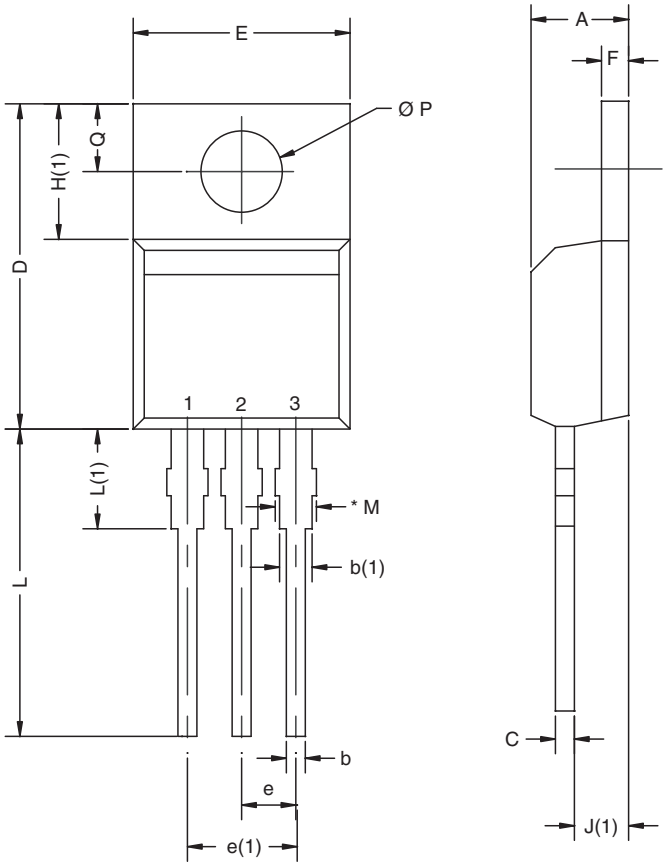

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118
ECN: X10-0416-Rev. M, 01-Nov-10 DWG: 5471				

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
Heatsink hole for HVM

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