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Stocking Distributor

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[Vishay/Siliconix](#)
[SIHP30N60E-E3](#)

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sales@integrated-circuit.com

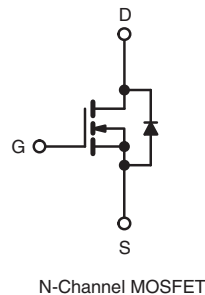
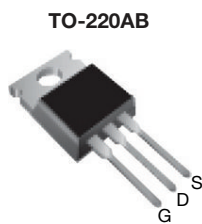


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SiHP30N60E
 Vishay Siliconix

E Series Power MOSFET

PRODUCT SUMMARY	
V _{DS} (V) at T _J max.	650
R _{DS(on)} max. at 25 °C (Ω)	V _{GS} = 10 V 0.125
Q _g max. (nC)	130
Q _{gs} (nC)	15
Q _{gd} (nC)	39
Configuration	Single



FEATURES

- Low figure-of-merit (FOM) R_{on} x Q_g
- Low input capacitance (C_{iss})
- Reduced switching and conduction losses
- Ultra low gate charge (Q_g)
- Avalanche energy rated (UIS)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
 COMPLIANT
 HALOGEN
FREE
 Available

APPLICATIONS

- Server and telecom power supplies
- Switch mode power supplies (SMPS)
- Power factor correction power supplies (PFC)
- Lighting
 - High-intensity discharge (HID)
 - Fluorescent ballast lighting
 - LED lighting
- Industrial
 - Welding
 - Induction heating
 - Motor drives
- Battery chargers
- Renewable energy
 - Solar (PV inverters)

ORDERING INFORMATION	
Package	TO-220AB
Lead (Pb)-free	SiHP30N60E-E3
Lead (Pb)-free and Halogen-free	SiHP30N60E-GE3

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V _{DS}	600	V	
Gate-Source Voltage	V _{GS}	± 30		
Continuous Drain Current (T _J = 150 °C)	V _{GS} at 10 V	T _C = 25 °C	29	A
		T _C = 100 °C	18	
Pulsed Drain Current ^a	I _{DM}	65		
Linear Derating Factor		2	W/°C	
Single Pulse Avalanche Energy ^b	E _{AS}	690	mJ	
Maximum Power Dissipation	P _D	250	W	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C	
Drain-Source Voltage Slope	dV/dt	V _{DS} = 0 V to 80 % V _{DS}	70	V/ns
Reverse Diode dV/dt ^d		18		
Soldering Recommendations (Peak Temperature) ^c	for 10 s	300	°C	

Notes

- Repetitive rating; pulse width limited by maximum junction temperature.
- V_{DD} = 50 V, starting T_J = 25 °C, L = 28.2 mH, R_g = 25 Ω, I_{AS} = 7 A.
- 1.6 mm from case.
- I_{SD} ≤ I_D, dI/dt = 100 A/μs, starting T_J = 25 °C.




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THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.5	

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	600	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^\circ\text{C}, I_D = 250\text{ }\mu\text{A}$	-	0.64	-	V/°C
Gate-Source Threshold Voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.0	2.8	4.0	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
		$V_{GS} = \pm 30\text{ V}$	-	-	± 1	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$	-	-	100	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$	-	0.104	0.125	Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 8\text{ V}, I_D = 3\text{ A}$	-	5.4	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 100\text{ V}, f = 1.0\text{ MHz}$	-	2600	-	pF
Output Capacitance	C_{oss}		-	138	-	
Reverse Transfer Capacitance	C_{rss}		-	3	-	
Effective Output Capacitance, Energy Related ^b	$C_{o(er)}$		-	98	-	
Effective Output Capacitance, Time Related ^c	$C_{o(tr)}$	$V_{DS} = 0\text{ V to } 480\text{ V}, V_{GS} = 0\text{ V}$	-	346	-	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}, V_{DS} = 480\text{ V}$	-	85	130	nC
Gate-Source Charge	Q_{gs}		-	15	-	
Gate-Drain Charge	Q_{gd}		-	39	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 380\text{ V}, I_D = 15\text{ A}, V_{GS} = 10\text{ V}, R_g = 4.7\text{ }\Omega$	-	19	40	ns
Rise Time	t_r		-	32	65	
Turn-Off Delay Time	$t_{d(off)}$		-	63	95	
Fall Time	t_f		-	36	75	
Gate Input Resistance	R_g	$f = 1\text{ MHz}, \text{open drain}$	-	0.63	-	Ω
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	29	A
Pulsed Diode Forward Current	I_{SM}		-	-	65	
Diode Forward Voltage	V_{SD}	$T_J = 25\text{ }^\circ\text{C}, I_S = 15\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.3	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^\circ\text{C}, I_F = I_S = 15\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, V_R = 20\text{ V}$	-	402	605	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	7	15	μC
Reverse Recovery Current	I_{RRM}		-	32	65	A

Notes

- Repetitive rating; pulse width limited by maximum junction temperature.
- $C_{oss(er)}$ is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .
- $C_{oss(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .



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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

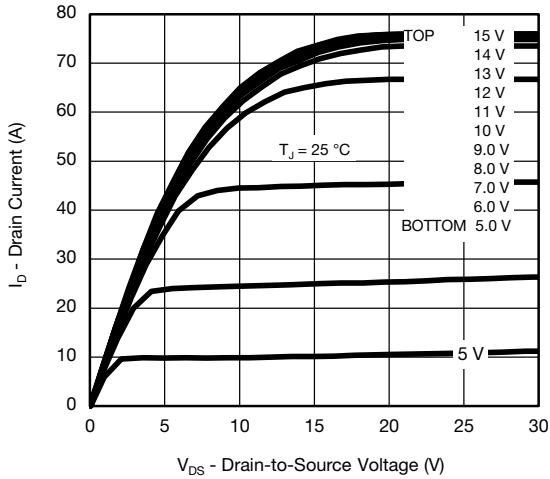


Fig. 1 - Typical Output Characteristics, $T_C = 25\text{ }^\circ\text{C}$

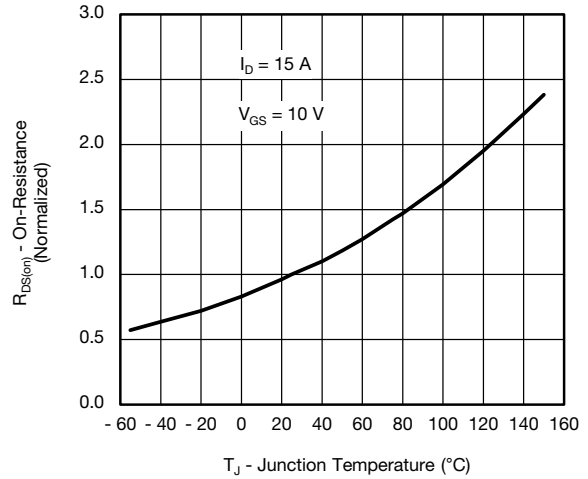


Fig. 4 - Normalized On-Resistance vs. Temperature

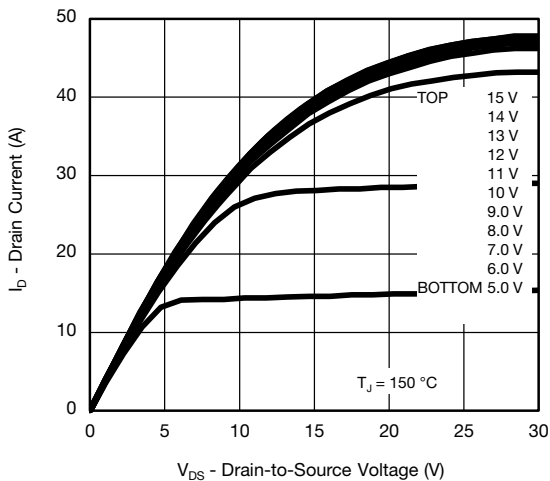


Fig. 2 - Typical Output Characteristics, $T_C = 150\text{ }^\circ\text{C}$

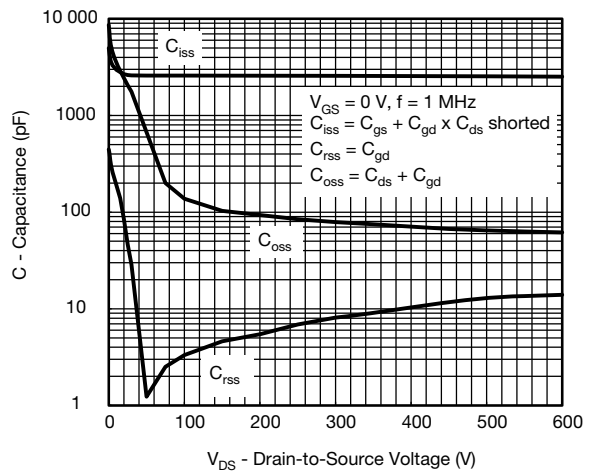


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

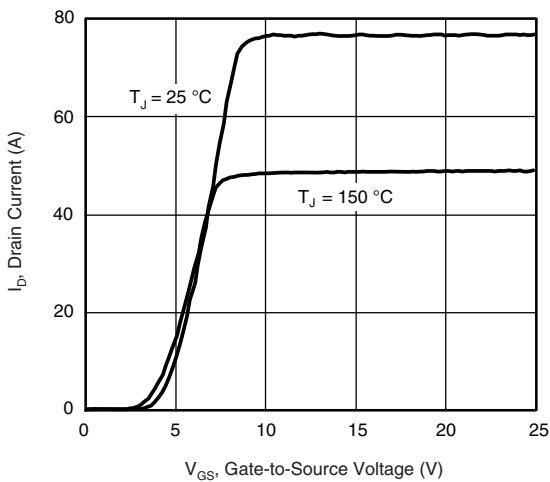


Fig. 3 - Typical Transfer Characteristics

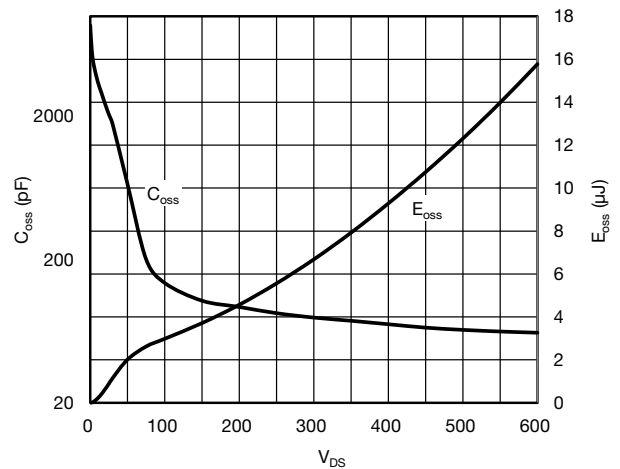


Fig. 6 - C_{oss} and E_{oss} vs. V_{DS}

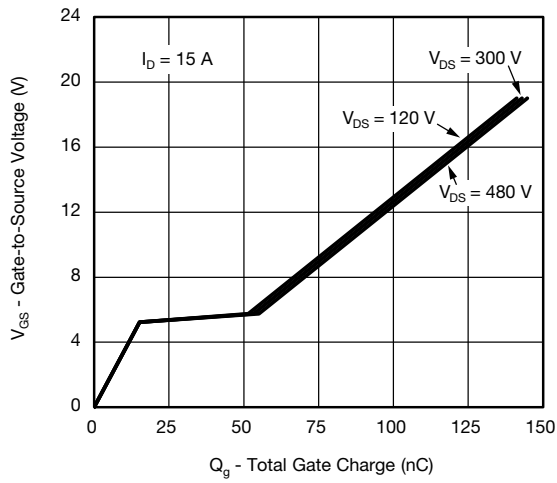


Fig. 7 - Typical Gate Charge vs. Gate-to-Source Voltage

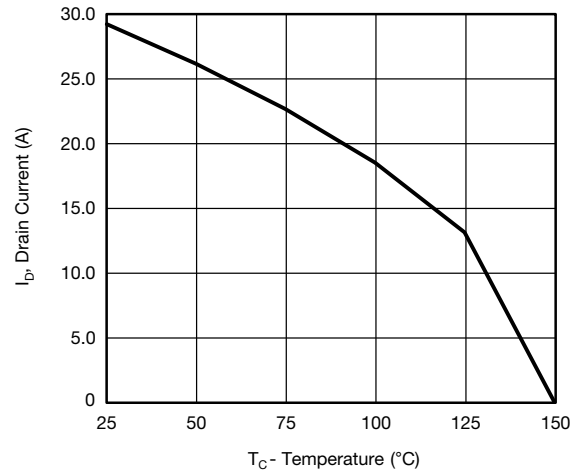


Fig. 10 - Maximum Drain Current vs. Case Temperature

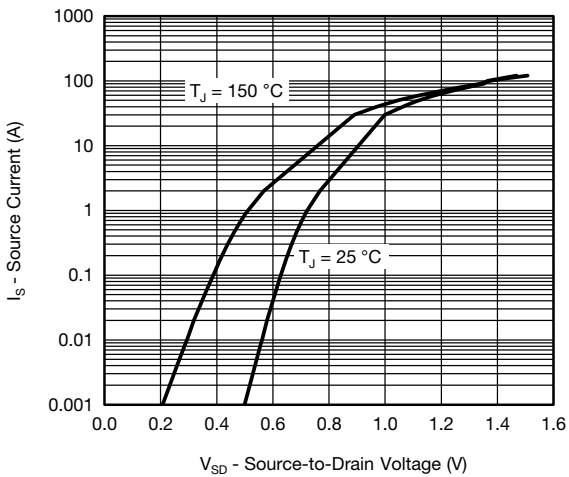


Fig. 8 - Typical Source-Drain Diode Forward Voltage

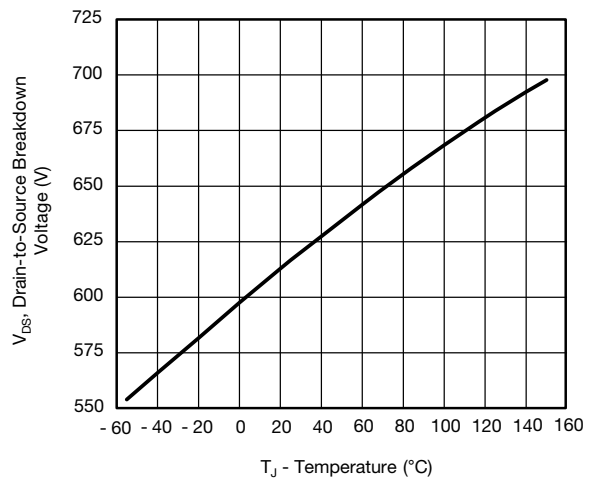


Fig. 11 - Temperature vs. Drain-to-Source Voltage

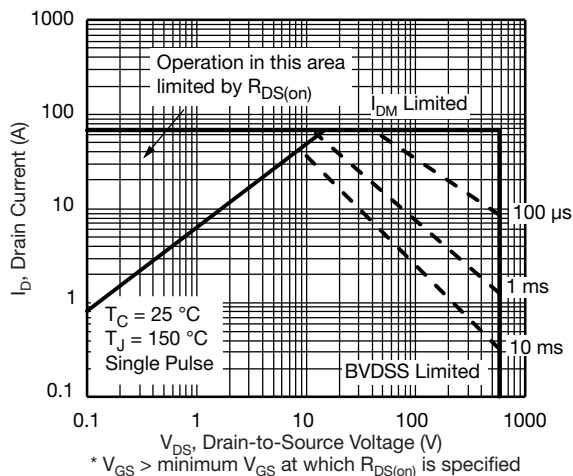


Fig. 9 - Maximum Safe Operating Area



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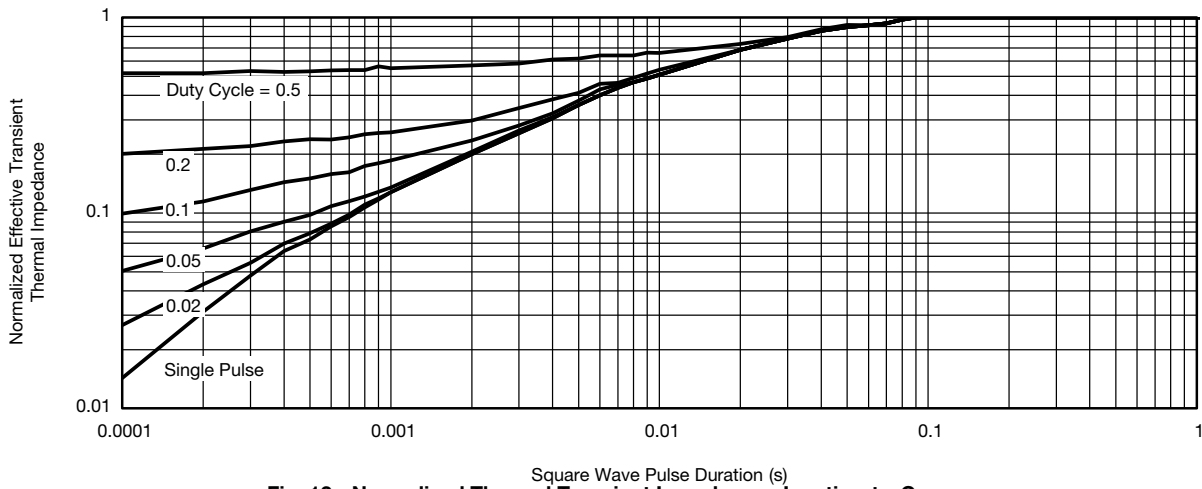


Fig. 12 - Normalized Thermal Transient Impedance, Junction-to-Case

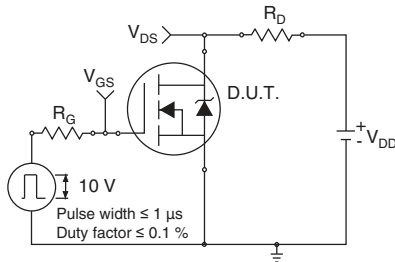


Fig. 13 - Switching Time Test Circuit

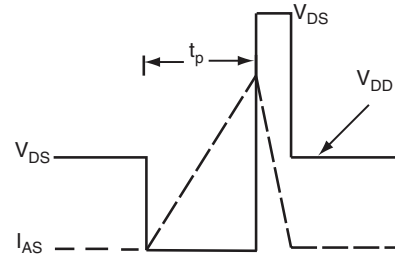


Fig. 16 - Unclamped Inductive Waveforms

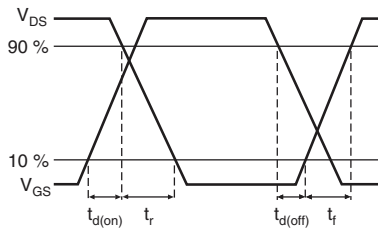


Fig. 14 - Switching Time Waveforms

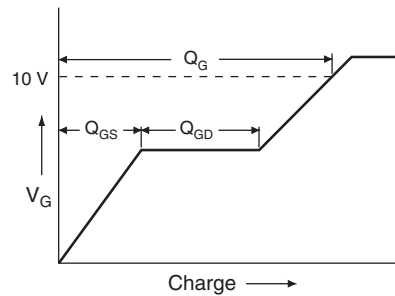


Fig. 17 - Basic Gate Charge Waveform

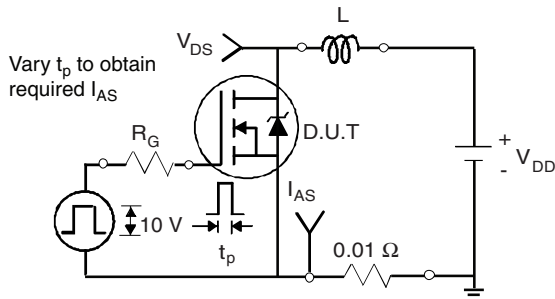


Fig. 15 - Unclamped Inductive Test Circuit

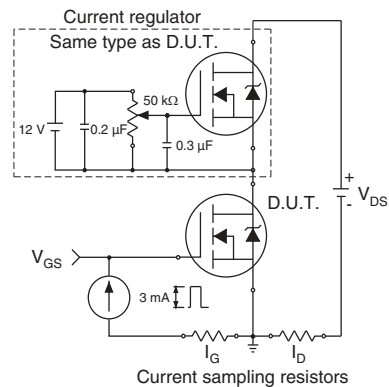
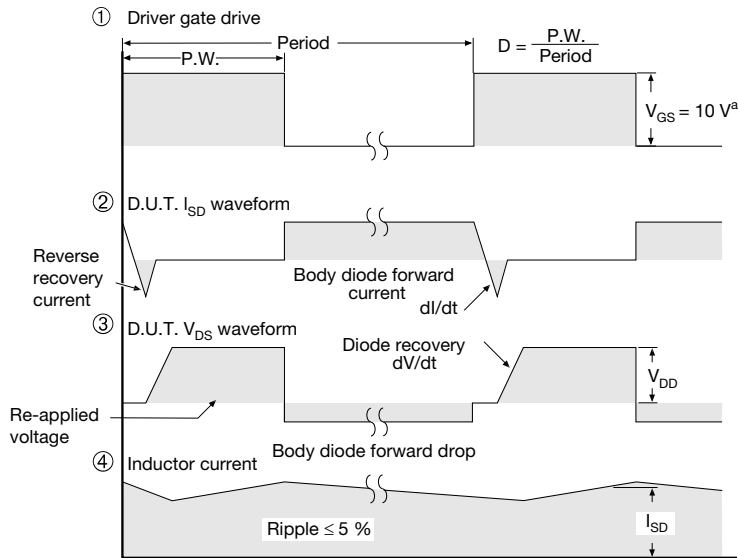
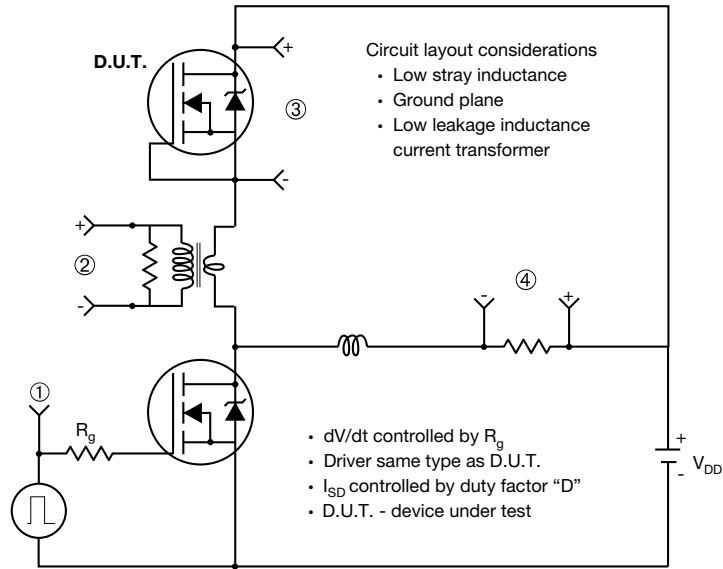


Fig. 18 - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit



Note

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

Fig. 19 - For N-Channel

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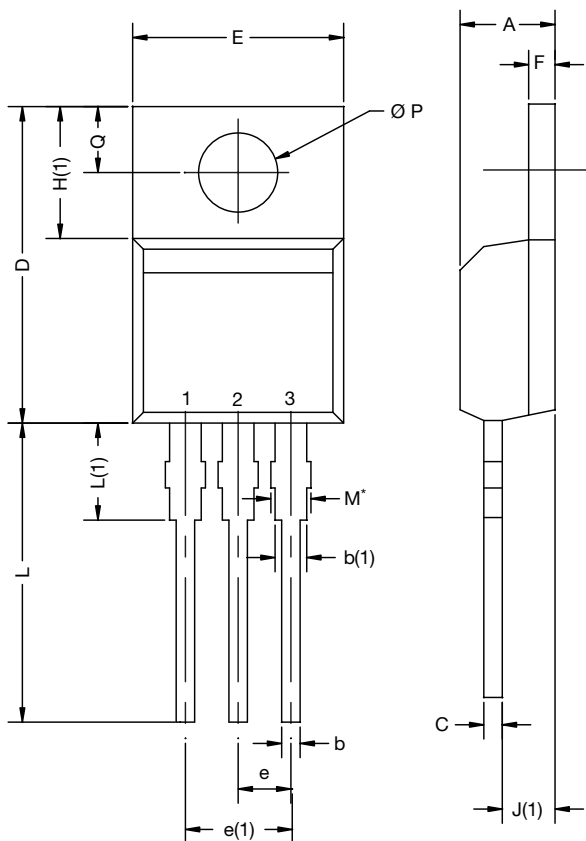


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Package Information

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TO-220-1

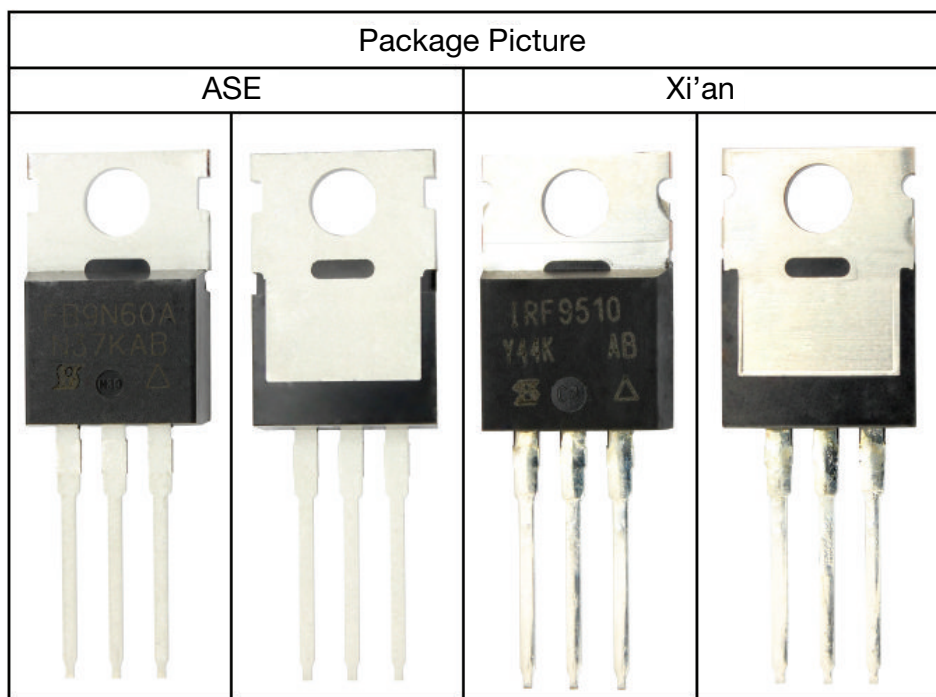


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.24	4.65	0.167	0.183
b	0.69	1.02	0.027	0.040
b(1)	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.33	15.85	0.564	0.624
E	9.96	10.52	0.392	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.10	6.71	0.240	0.264
J(1)	2.41	2.92	0.095	0.115
L	13.36	14.40	0.526	0.567
L(1)	3.33	4.04	0.131	0.159
Ø P	3.53	3.94	0.139	0.155
Q	2.54	3.00	0.100	0.118

ECN: X15-0364-Rev. C, 14-Dec-15
DWG: 6031

Note

- M* = 0.052 inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM





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