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Stocking Distributor

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[Vishay/Siliconix](#)

[IRFB17N50L](#)

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sales@integrated-circuit.com



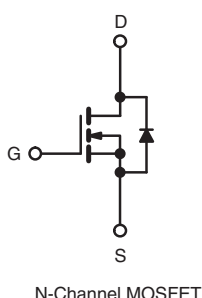
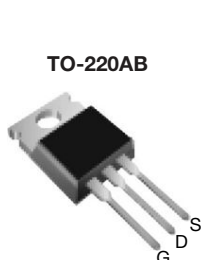
IRFB17N50L, SiHFB17N50L

Vishay Siliconix

Power MOSFET

PRODUCT SUMMARY

V _{DS} (V)	500	
R _{DS(on)} (Ω)	V _{GS} = 10 V	0.28
Q _g (Max.) (nC)	130	
Q _{gs} (nC)	33	
Q _{gd} (nC)	59	
Configuration	Single	



FEATURES

- Low Gate Charge Q_g results in Simple Drive Requirement
- Improved Gate, Avalanche and Dynamic dV/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current
- Low t_{rr} and Soft Diode Recovery
- Compliant to RoHS Directive 2002/95/EC



RoHS*
COMPLIANT

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply
- High Speed Power Switching
- ZVS and High Frequency Circuit
- PWM Inverters

ORDERING INFORMATION

Package	TO-220AB
Lead (Pb)-free	IRFB17N50LPbF SiHFB17N50L-E3
SnPb	IRFB17N50L SiHFB17N50L

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	500	V
Gate-Source Voltage	V _{GS}	± 30	
Continuous Drain Current	V _{GS} at 10 V	T _C = 25 °C	A
		T _C = 100 °C	
Pulsed Drain Current ^a	I _{DM}	64	
Linear Derating Factor		1.8	W/°C
Single Pulse Avalanche Energy ^b	E _{AS}	390	mJ
Repetitive Avalanche Current ^a	I _{AR}	16	A
Repetitive Avalanche Energy ^a	E _{AR}	22	mJ
Maximum Power Dissipation	P _D	220	W
Peak Diode Recovery dV/dt ^c	dV/dt	13	V/ns
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d	
Mounting Torque	6-32 or M3 screw	10	lbf · in
		1.1	N · m

Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- Starting T_J = 25 °C, L = 3.0 mH, R_g = 25 Ω, I_{AS} = 16 A (see fig. 12).
- I_{SD} ≤ 16 A, dI/dt ≤ 347 A/μs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.
- 1.6 mm from case.

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

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THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	-	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.56	

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA		500	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA		-	0.6	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		3.0	-	5.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 30 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V		-	-	50	μA
		V _{DS} = 400 V, V _{GS} = 0 V, T _J = 125 °C		-	-	2.0	mA
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 9.9 A ^b	-	0.28	0.32	Ω
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 9.9 A ^b		11	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1.0 MHz, see fig. 5		-	2760	-	pF
Output Capacitance	C _{oss}			-	325	-	
Reverse Transfer Capacitance	C _{rss}			-	37	-	
Output Capacitance	C _{oss}	V _{GS} = 0 V	V _{DS} = 1.0 V , f = 1.0 MHz	-	3690	-	pF
		V _{GS} = 0 V	V _{DS} = 400 V , f = 1.0 MHz	-	84	-	
Effective Output Capacitance	C _{oss eff.}	V _{GS} = 0 V	V _{DS} = 0 V to 400 V ^c	-	159	-	
Total Gate Charge	Q _g	V _{GS} = 10 V	I _D = 16 A, V _{DS} = 400 V, see fig. 6 and 13 ^b	-	-	130	nC
Gate-Source Charge	Q _{gs}			-	-	33	
Gate-Drain Charge	Q _{gd}			-	-	59	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 250 V, I _D = 16 A, R _g = 7.5 Ω, see fig. 10 ^b		-	21	-	ns
Rise Time	t _r			-	51	-	
Turn-Off Delay Time	t _{d(off)}			-	50	-	
Fall Time	t _f			-	28	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode 		-	-	16	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	64	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = 16 A, V _{GS} = 0 V ^b		-	-	1.5	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C	I _F = 16 A, dI/dt = 100 A/μs ^b	-	170	250	ns
		T _J = 125 °C		-	220	330	
Body Diode Reverse Recovery Charge	Q _{rr}	T _J = 25 °C		-	470	710	nC
		T _J = 125 °C		-	810	1210	
Reverse Recovery Current	I _{RRM}			-	7.3	11	A
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D)					

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. Pulse width $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\text{ }\%$.



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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

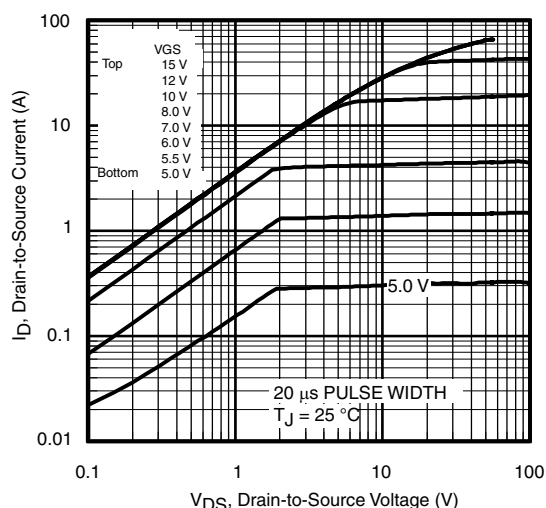


Fig. 1 - Typical Output Characteristics

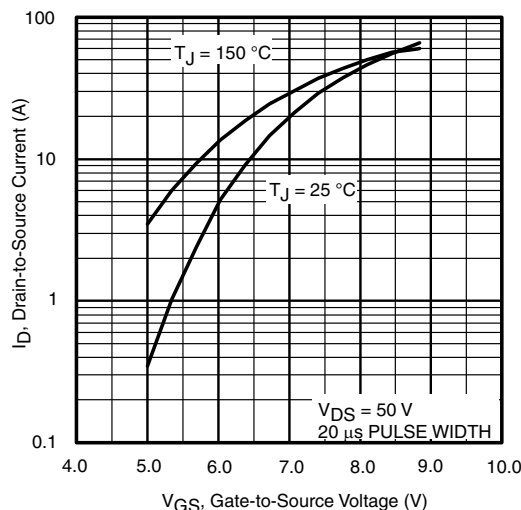


Fig. 3 - Typical Transfer Characteristics

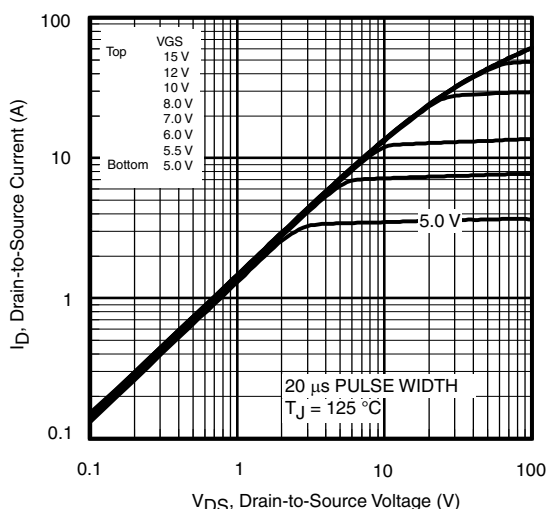


Fig. 2 - Typical Output Characteristics

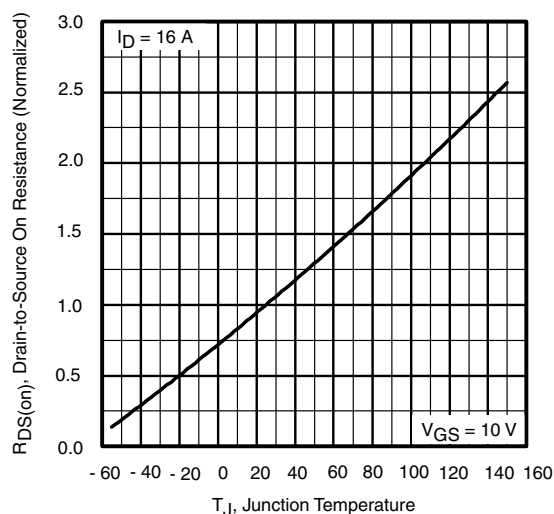


Fig. 4 - Normalized On-Resistance vs. Temperature

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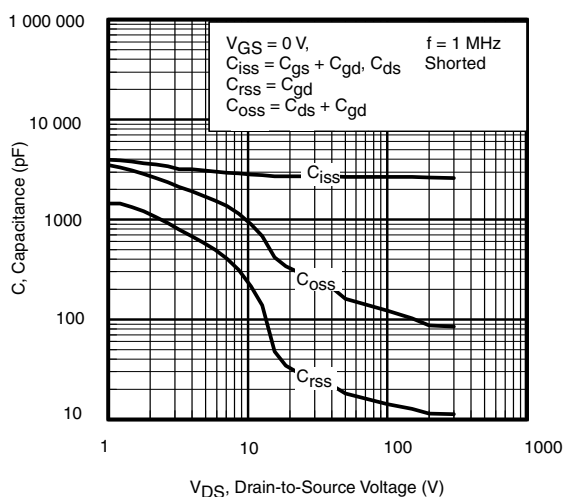


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

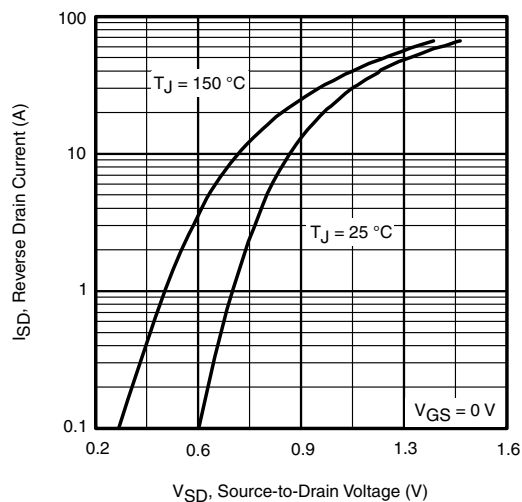


Fig. 7 - Typical Source-Drain Diode Forward Voltage

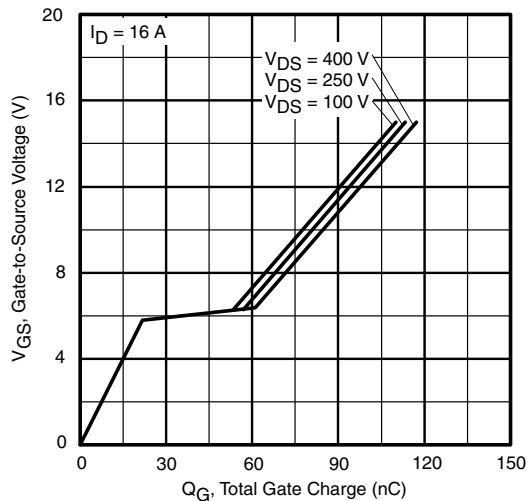


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

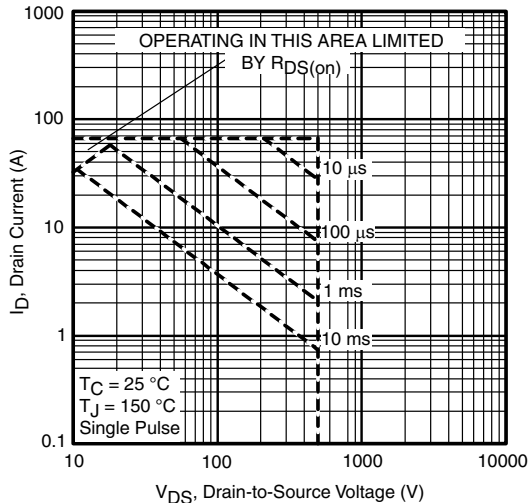


Fig. 8 - Maximum Safe Operating Area



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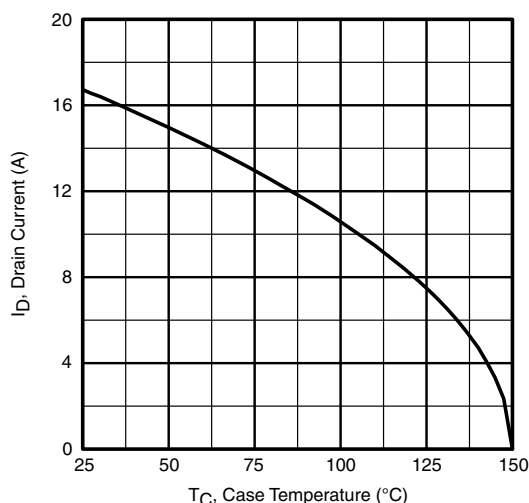


Fig. 9 - Maximum Drain Current vs. Case Temperature

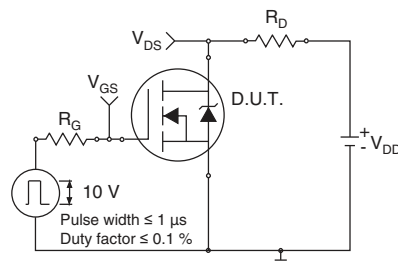


Fig. 10a - Switching Time Test Circuit

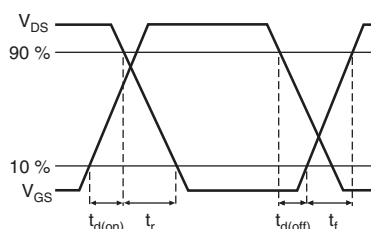


Fig. 10b - Switching Time Waveforms

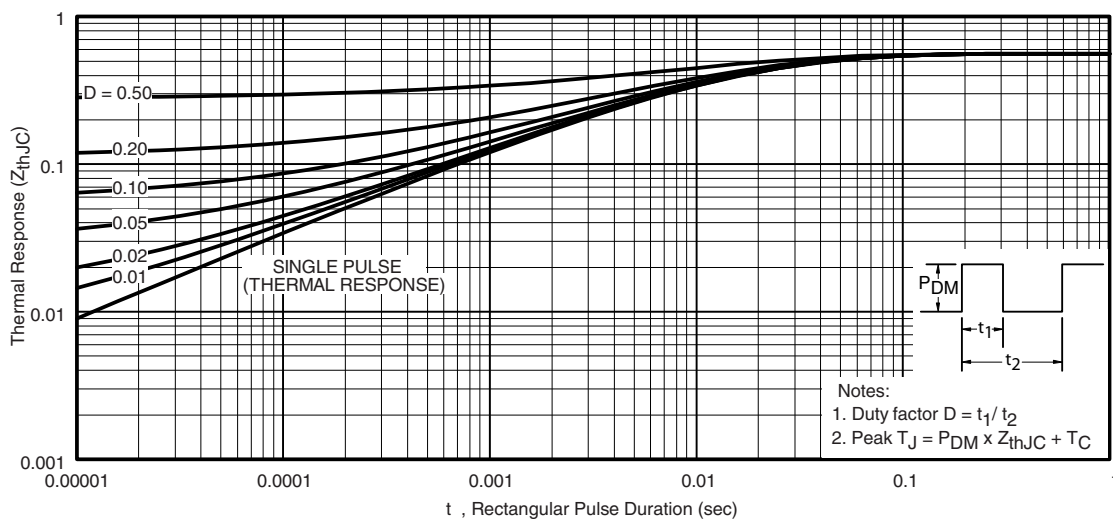


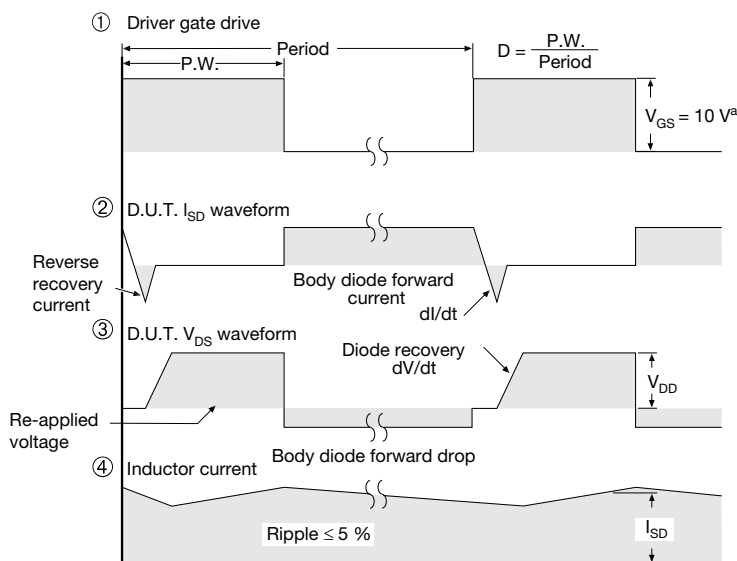
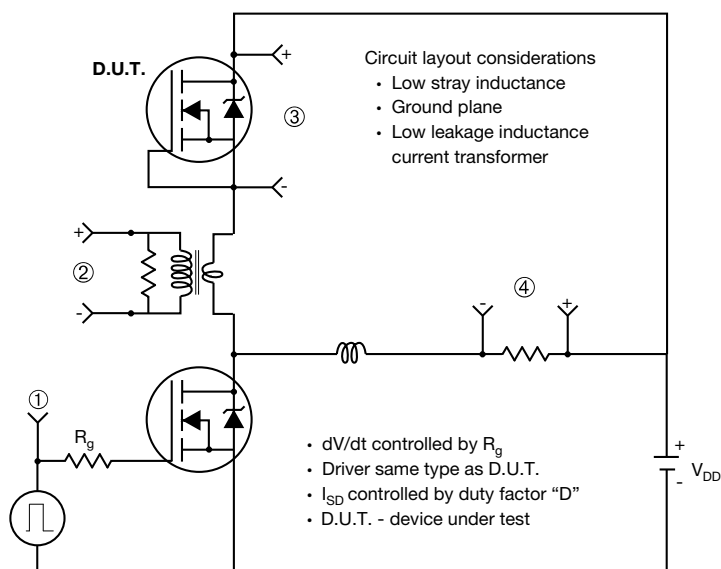
Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case



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Peak Diode Recovery dV/dt Test Circuit



Note

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

Fig. 14 - For N-Channel

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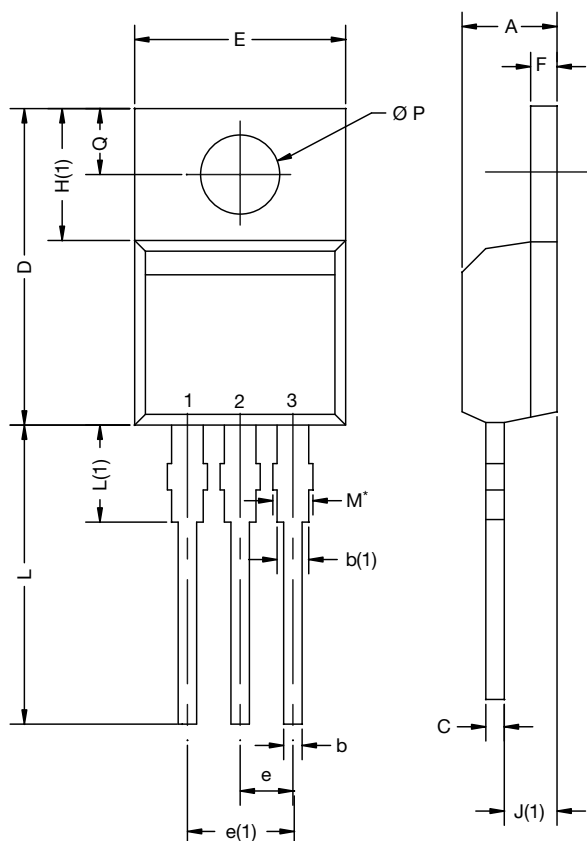


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Package Information

Vishay Siliconix

TO-220-1



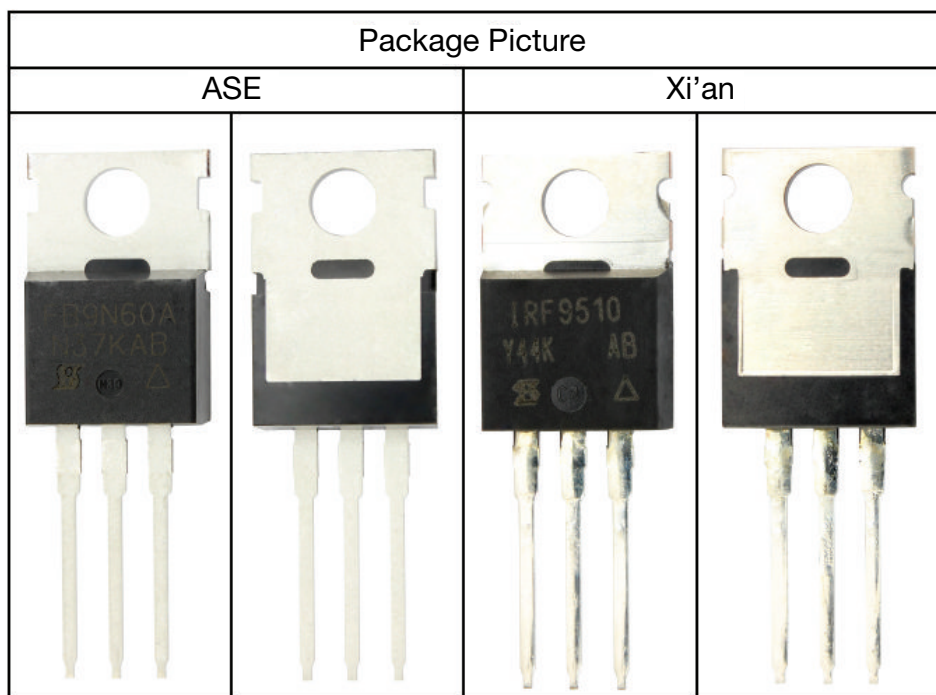
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.24	4.65	0.167	0.183
b	0.69	1.02	0.027	0.040
b(1)	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.33	15.85	0.564	0.624
E	9.96	10.52	0.392	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.10	6.71	0.240	0.264
J(1)	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

Package Picture





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