



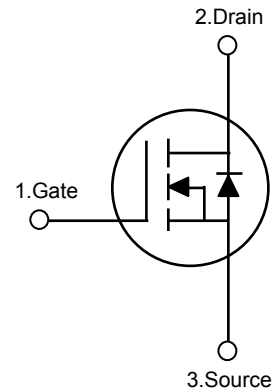
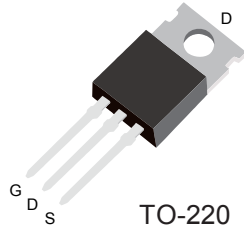
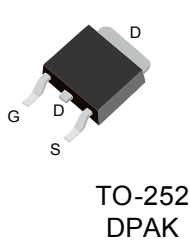
90A, 30V N-CHANNEL POWER MOSFET

Features

- Advanced process technology
- Ultra low On-Resistance
- 175 °C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to T_{jmax}
- Lead-Free

Product Summary

V_{DS}	30	V
$R_{DS(ON)}$ Max.	4.5	mΩ
I_D	90	A



ORDERING INFORMATION

Order Number	Package	Pin Assignment			Packing
		1	2	3	
HPD045N03CTA	TO-252 (DPAK)	G	D	S	Tube Reel
HPP045N03CTA	TO-220	G	D	S	Tube

ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Drain source voltage	V_{DS}		30	V
Gate source voltage	V_{GS}		±12	
Continuous Drain Current	I_D	$T_C=25^{\circ}C$	90	A
		$T_C=100^{\circ}C$	65	
Pulsed Drain Current	$I_{D,pulse}$	$T_C=25^{\circ}C$	360	
Avalanche energy, single pulse	E_{AS}	$I_{AS}=30A, V_{GS}=25\Omega$	270	mJ
Peak Diode Recovery de/dt	dv/dt	$I_D=30A, V_{GS}=10V,$ $di/dt=200A/\mu s$ $T_{jmax}=175^{\circ}C$	6	KV/ μS
Power dissipation	P_{tot}	$T_C=25^{\circ}C$	81	W
Operating and storage temperature	T_J, T_{stg}		-55 to 175	$^{\circ}C$

**Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance, junction-case	R_{thJC}	TO-252 / TO-220	--	--	1.85	°C/W
SMD Version, Device on PCB	R_{thJA}	TO-220	--	--	60	
		TO-252	--	--	75	

Electrical characteristics, at=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	--	--	V
Gate source voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	
Zero gate voltage drian current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ C$	--	0.1	1	μA
		$V_{DS}=30V, V_{GS}=0V, T_J=125^\circ C$	--	1	100	
Gate-source leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	--	± 10	± 100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$	--	3.3	4.5	m Ω
Transconductance	g_{fs}	$ V_{DS} > 2 \times I_D $ $\times R_{DS(on)max}$ $I_D=15A$	12	28	--	S

Dynamic Characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
lutput capacitance	C_{iss}	$V_{GS}=0V$ $V_{DS}=30V$ $f=1MHz$	--	2153	--	pF
Output capacitance	C_{oss}		--	327	--	
Reverse transfer capacitance	C_{rss}		--	287	--	
Turn-on delay time	$t_{d(on)}$	$V_{DS}=15V$ $V_{GS}=10V$ $I_D=30A$ $R_G=3\Omega$	--	21	--	nS
Risse time	t_r		--	32	--	
Turn-off delay time	$t_{d(off)}$		--	59	--	
Fall time	t_f		--	34	--	



Gate Charge Characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Gate to source charge	Q_{gs}	$V_{DS}=25V$ $I_D=30A$ $V_{GS}=10V$	--	3.0	3.9	nC
Gate to drain charge	Q_{gd}		--	5.7	8.5	
Gate charge total	Q_g		--	45	17	

Reverse Diode

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Diode continuous forward current	I_S	$T_C=25^\circ C$	--	--	90	A
Diode pulse current	$I_{S,pulse}$	$T_C=25^\circ C$	--	--	360	
Diode forward voltage	V_{SD}	$V_{GS}=0V$ $I_F=30A, T_C=25^\circ C$	--	--	1.2	V
Reverse recovery time	t_{rr}	$V_R=30V, I_F=I_S$ $di_F/dt=100A/\mu s$	--	15	--	μs
Reverse recovery charge	Q_{rr}		--	4	--	nC



Test Circuits and Waveforms

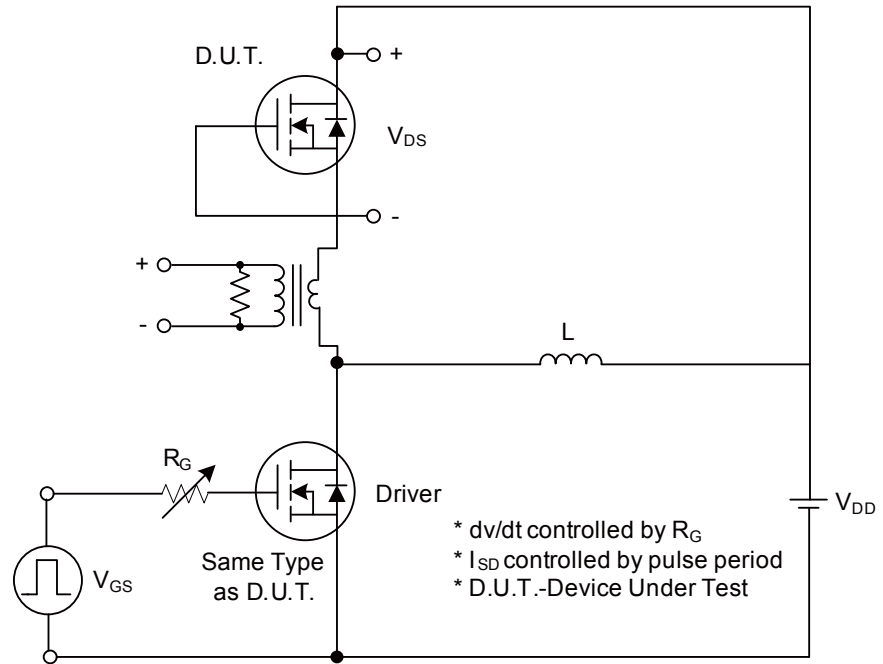


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

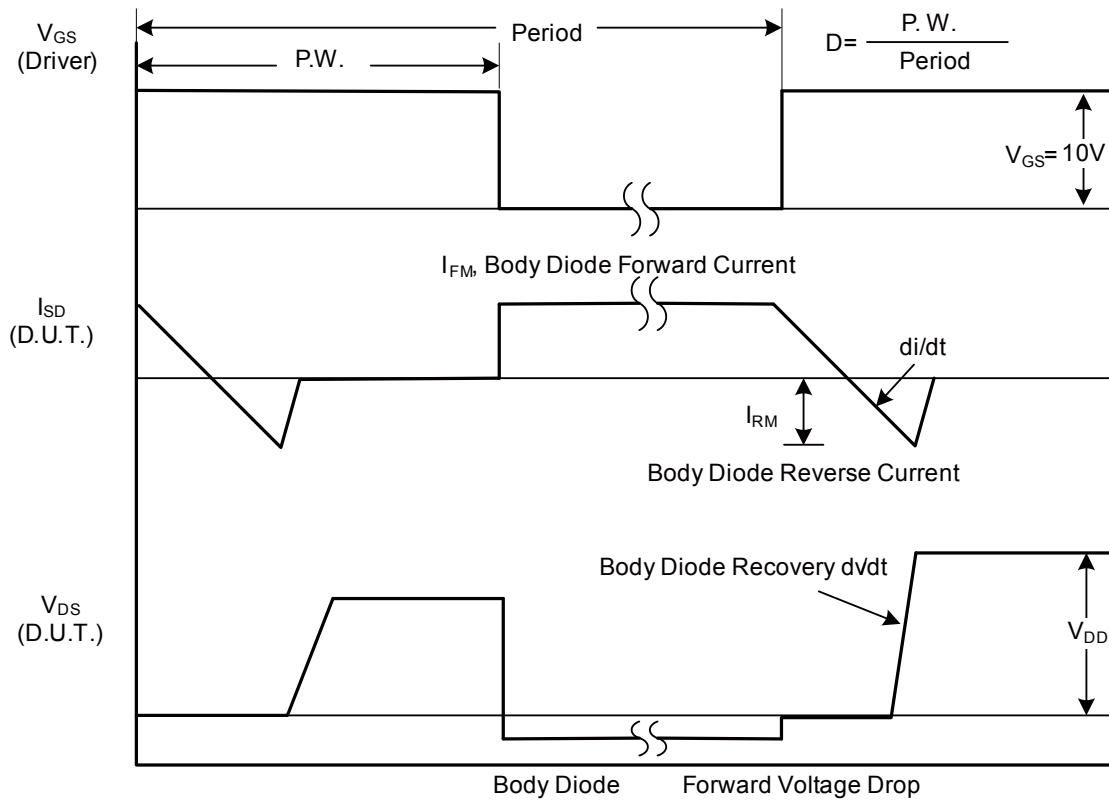


Fig. 1B Peak Diode Recovery dv/dt Waveforms



Test Circuits and Waveforms

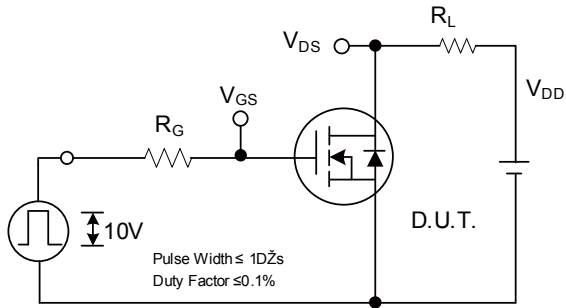


Fig. 2A Switching Test Circuit

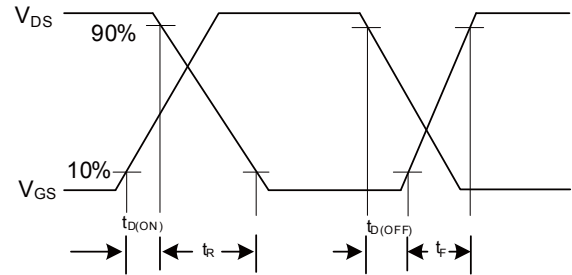


Fig. 2B Switching Waveforms

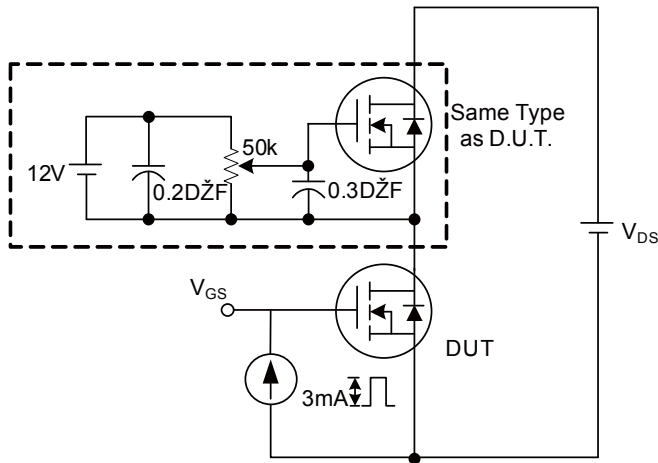


Fig. 3A Gate Charge Test Circuit

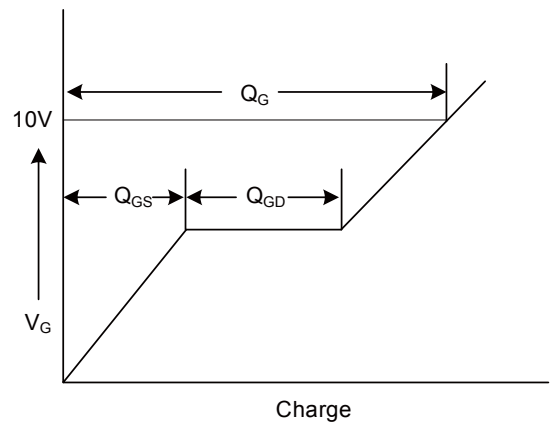


Fig. 3B Gate Charge Waveform

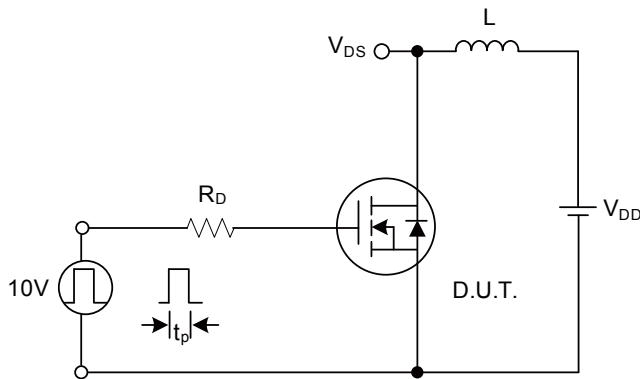


Fig.4A Unclamped Inductive Switching Test Circuit

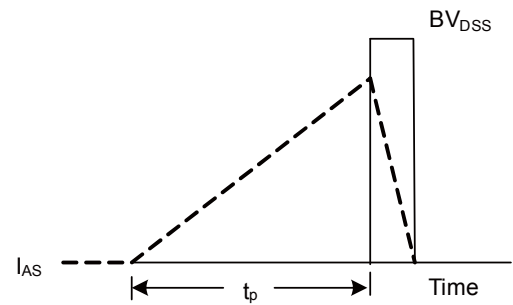


Fig.4B Unclamped Inductive Switching Waveforms



Typical Performance Characteristics

Figure 1: Output Characteristics



Figure 2: Typical Transfer Characteristics

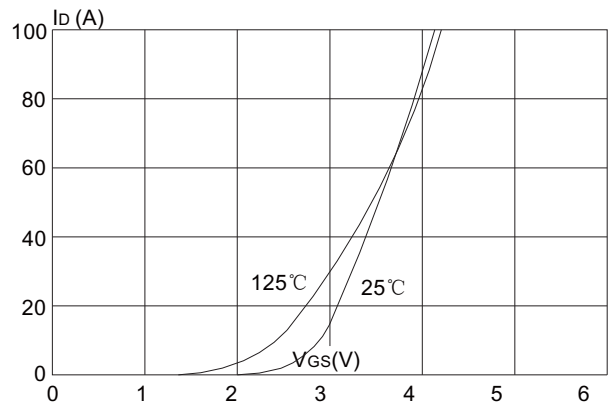


Figure 3: On-resistance vs. Drain Current

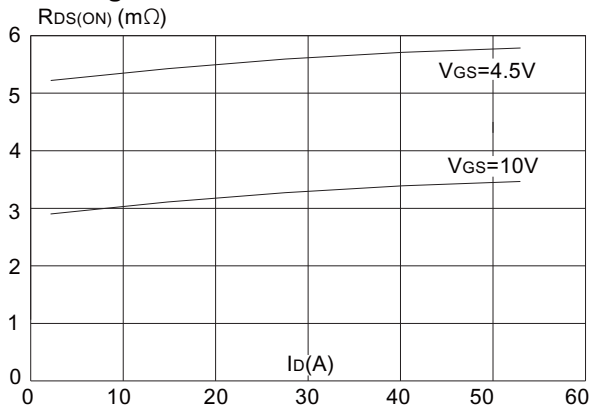


Figure 4: Body Diode Characteristics

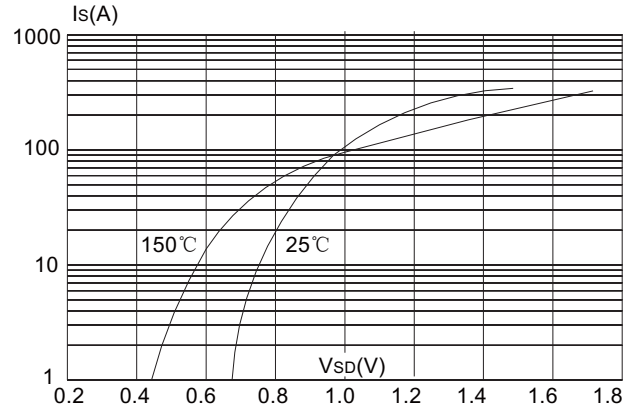


Figure 5: Gate Charge Characteristics

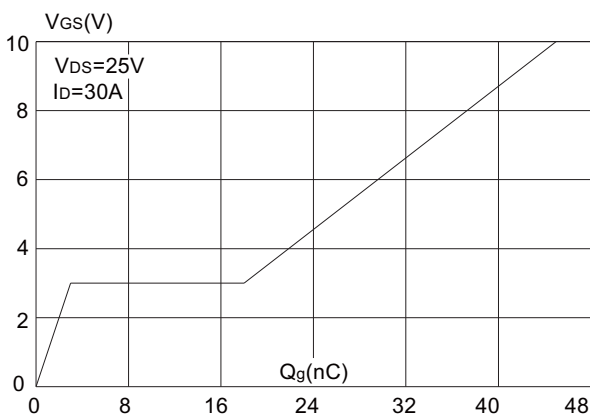


Figure 6: Capacitance Characteristics

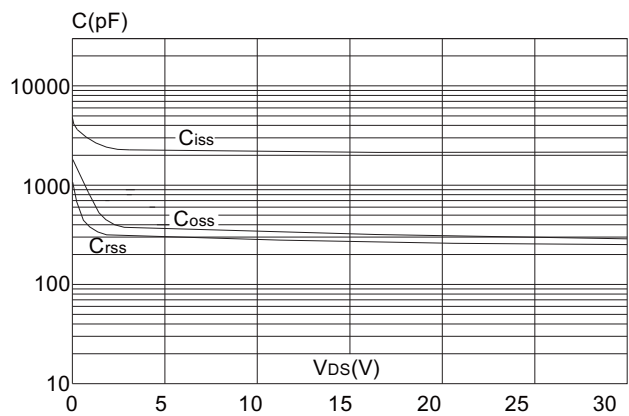




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

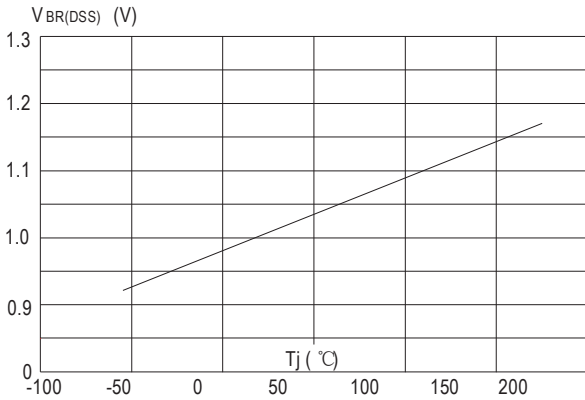


Figure 8: Normalized on Resistance vs. Junction Temperature

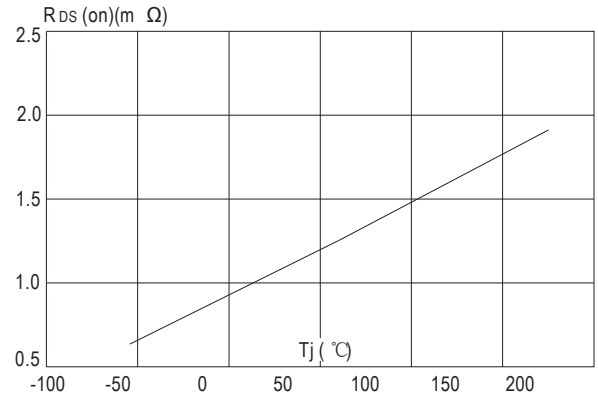


Figure 9: Maximum Safe Operating Area

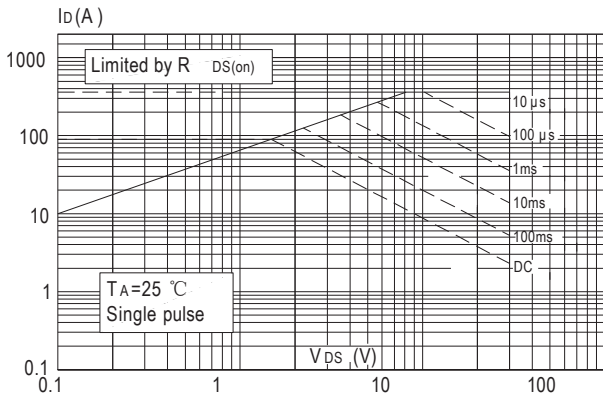


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

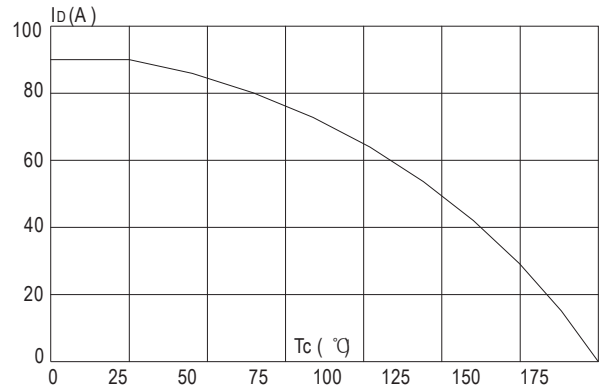
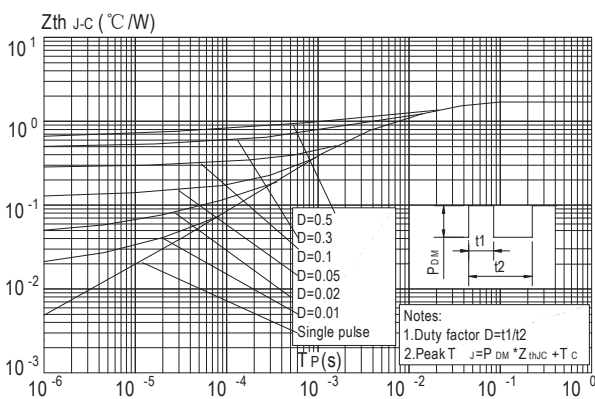
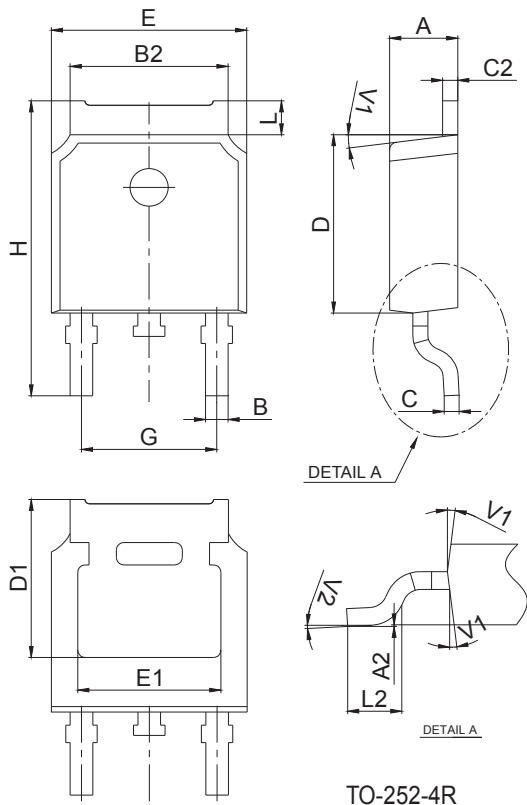
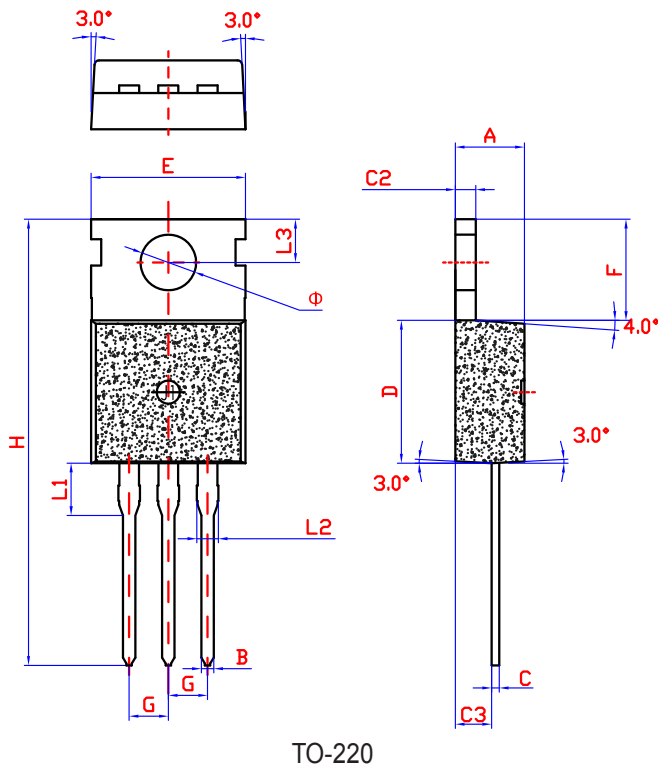


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30 REF			0.209 REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2		0°	6°	0°		6°



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.4		4.6	0.173		1.181
B	0.7		0.9	0.027		0.035
C	0.45		0.6	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.2		2.6	0.086		0.102
D	8.9		9.9	0.350		0.390
E	9.9		10.3	0.390		0.406
F	6.3		6.9	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	11.0		11.7
L1		3.2			0.126	
L2	1.14		1.7	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	



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