

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D@25^{\circ}C$
1200V	50m Ω @18V	42A

Feature

- High speed switching
- Essentially no switching losses
- Reduction of heat sink requirements
- Maximum working temperature at 175°C
- High blocking voltage
- Fast Intrinsic diode with low recovery current
- High-frequency operation

Application

- Power factor correction(PFC)
- Solar inverter
- Uninterruptible power supply
- Motor drives
- Photovoltaic inverter
- Electric car and charger

Package

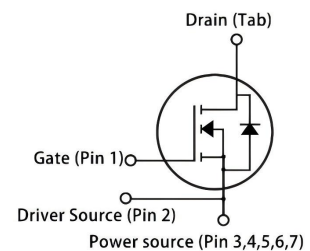


T2PAK

Marking



Circuit diagram



Absolute maximum ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DSmax}	$V_{GS}=0V$, $I_D=100\mu A$, $T_J=25^{\circ}C$	1200	V
Gate-Source Voltage	V_{GSmax}	AC $f>1Hz$, duty cycle $<1\%$, $T_J=25^{\circ}C$	-8/+22	V
Recommend Gate-Source Voltage	V_{GSop}	$T_J=25^{\circ}C$	-5/+18	V
Continuous Drain Current	I_D	$V_{GS}=18V$	42	A
	I_D	$V_{GS}=18V$, $T_C=100^{\circ}C$	28	A
Pulsed Drain Current	$I_{DM (pluse)}$	Pulse with t_p limited by T_{Jmax}	90	A
Single Pulse Avalanche Energy	E_{AS}	$V_{DS}=75V$, $L=30mH$	534	mJ
Power Dissipation	P_D	$T_J=175^{\circ}C$	187	W
Thermal Resistance (Typ)	$R_{\theta JC}$	Junction to Case	0.83	$^{\circ}C/W$
Operating Junction Temperature	T_J		-55~ +175	$^{\circ}C$
Storage Temperature	T_{STG}		-55~ +175	$^{\circ}C$

Electrical characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =100μA	1200			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V			100	μA
Gate-Source leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =18V			100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =8mA	2	3	4	V
		V _{DS} =V _{GS} , I _D =8mA ,T _J =175℃		2.3		
Drain-source on-resistance	R _{DS(on)}	V _{GS} =15V, I _D =20A		60		mΩ
		V _{GS} =18V, I _D =20A		50	66	
		V _{GS} =15V, I _D =20A ,T _J =175℃		100		
		V _{GS} =18V, I _D =20A ,T _J =175℃		92		
Transconductance	g _{fs}	V _{DS} =20V, I _D =20A		15		S
		V _{DS} =20V, I _D =20A ,T _J =175℃		14.5		
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =800V, V _{GS} =0V, V _{AC} =25mV f =1MHz ,T _J =25℃		2138		pF
Output Capacitance	C _{oss}			88		
Reverse Transfer Capacitance	C _{rss}			4.6		
Coss Stored Energy	E _{oss}				35	
Total Gate Charge	Q _g	V _{DS} =800V, V _{GS} =-5V/+18V I _D =20A		78.8		nC
Gate-Source Charge	Q _{gs}			21.4		
Gate-Drain Charge	Q _{gd}			41.6		
Internal Gate Resistance	R _{G(int)}	f =1MHz		1.5		Ω
Turn-on delay time	t _{d(on)}	V _{DS} =800V, V _{GS} =-5/+18V I _D =20A, R _G =2.4Ω, L=100μH		7.2		nS
Turn-on rise time	t _r			12		
Turn-off delay time	t _{d(off)}			20.3		
Turn-off fall time	t _f			12		
Turn-On Energy	E _{on}			185		μJ
Turn-Off Energy	E _{off}			53		
Source-Drain Diode characteristics						
Diode Forward Current	I _S	V _{GS} =-5V		35		A
Diode Forward voltage	V _{SD}	V _{GS} =-5V, I _{SD} =10A		4.3		V
		V _{GS} =0V, I _{SD} =10A, T _J =175℃		3.1		
Reverse Recovery Time	T _{rr}	V _{GS} =-5V, V _R =800V, I _D =20A di/dt =2000 A/μs		15.6		nS
Reverse Recovery Charge	Q _{rr}			127		nC
Peak Reverse Recovery Current	I _{rrm}				13.6	

Typical Characteristics

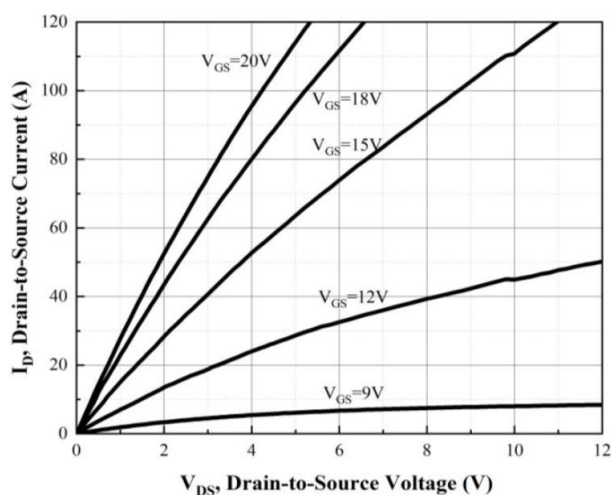


Figure 1. Output Characteristics $T_j = -55^{\circ}\text{C}$

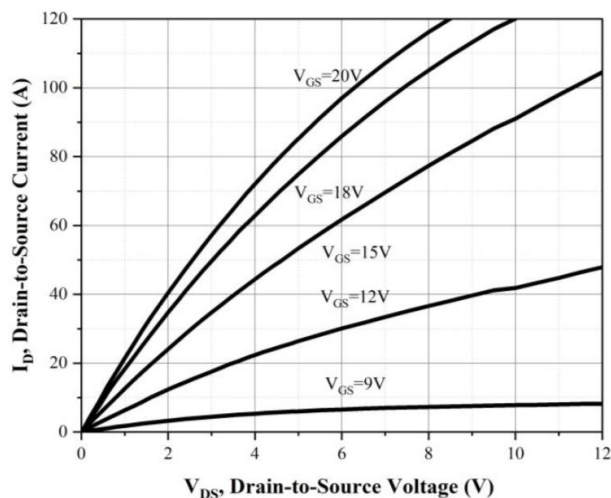


Figure 2. Output Characteristics $T_j = 25^{\circ}\text{C}$

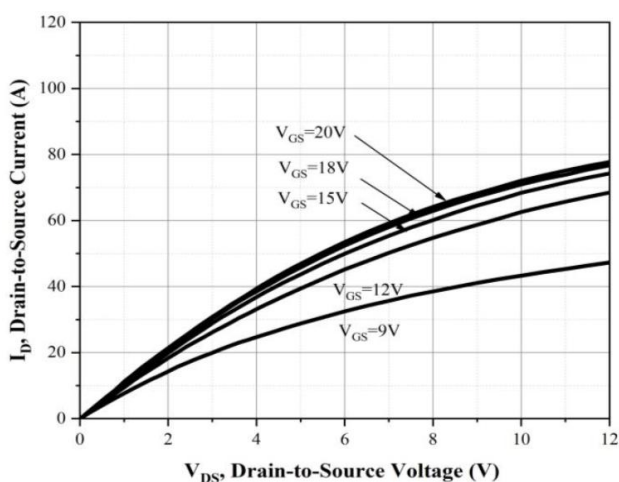


Figure 3. Output Characteristics $T_j = 175^{\circ}\text{C}$

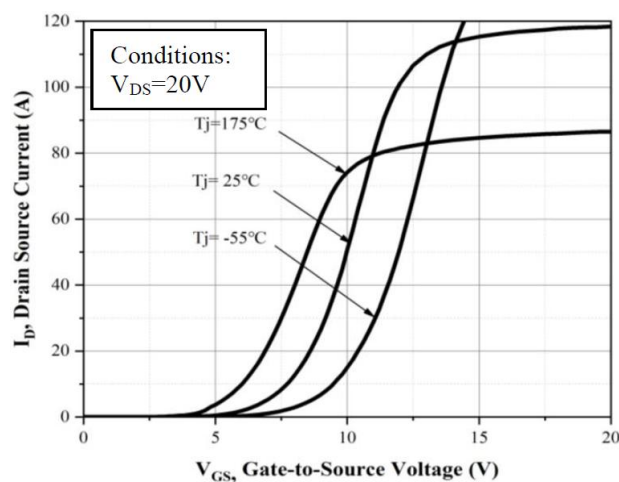


Figure 4. Transfer Characteristics for Various Junction Temperature

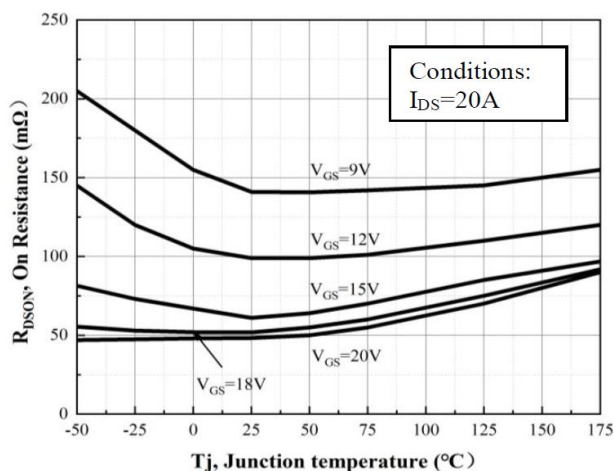


Figure 5. On-resistance vs. Temperature for Various Gate Voltage

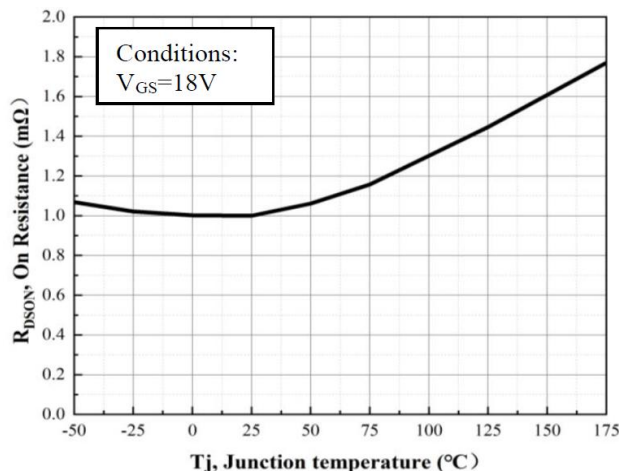


Figure 6. Normalized on-resistance vs. Temperature

Typical Characteristics

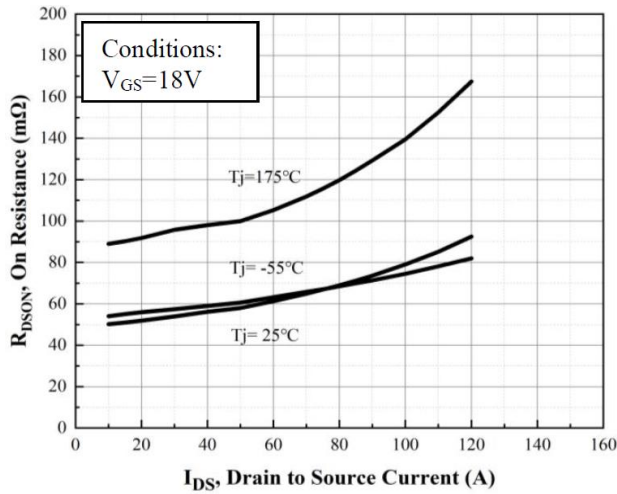


Figure 7. On-resistance vs. Drain Current

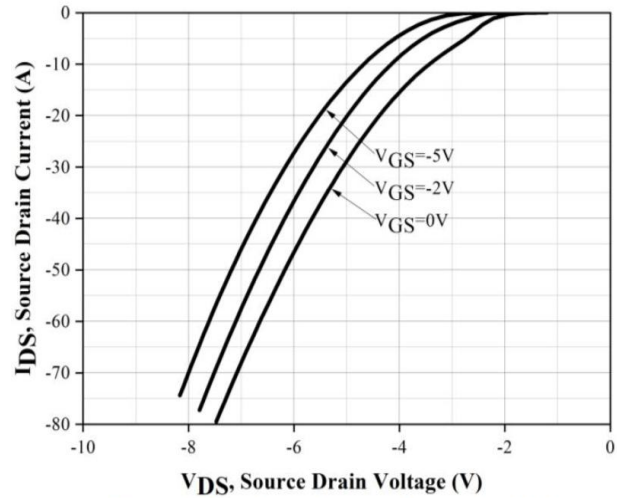


Figure 8. Body Diode Characteristic at Tj= 25 °C

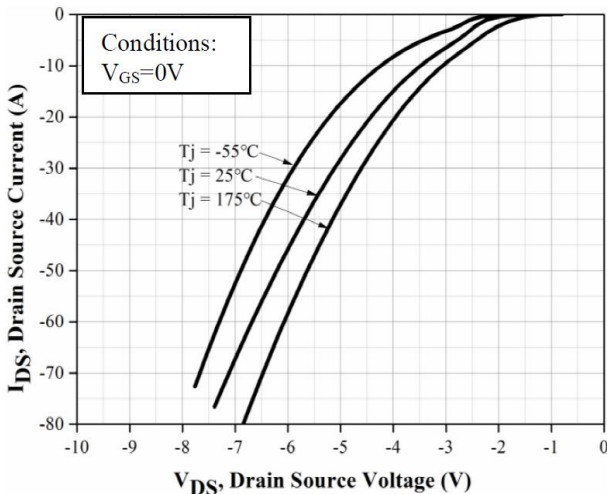


Figure 9. Body Diode Characteristic

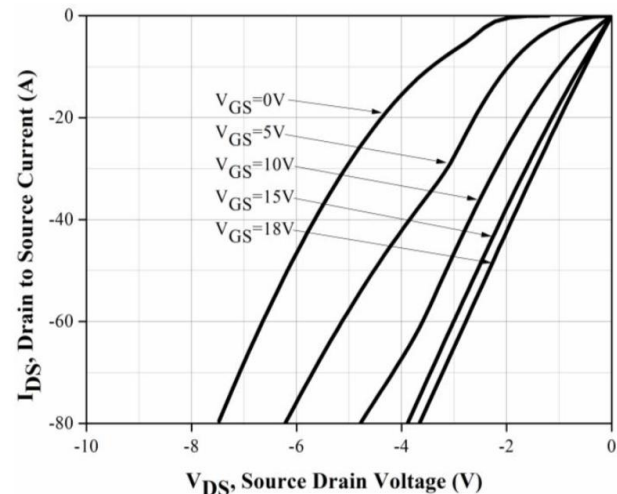


Figure 10. 3rd quadrant Characteristic at Tj= 25 °C

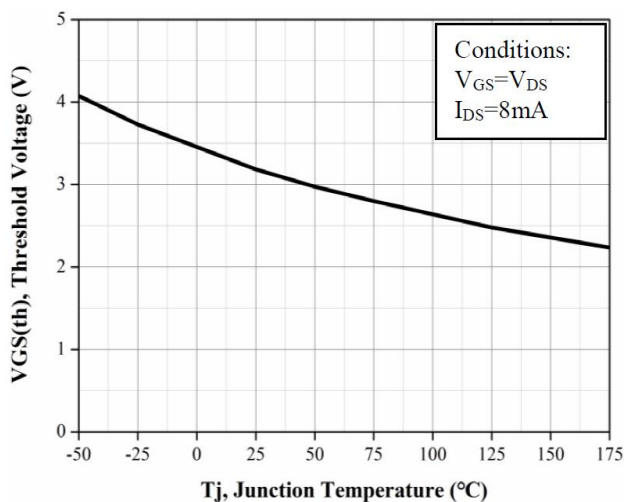


Figure 11. Threshold Voltage vs. Temperature

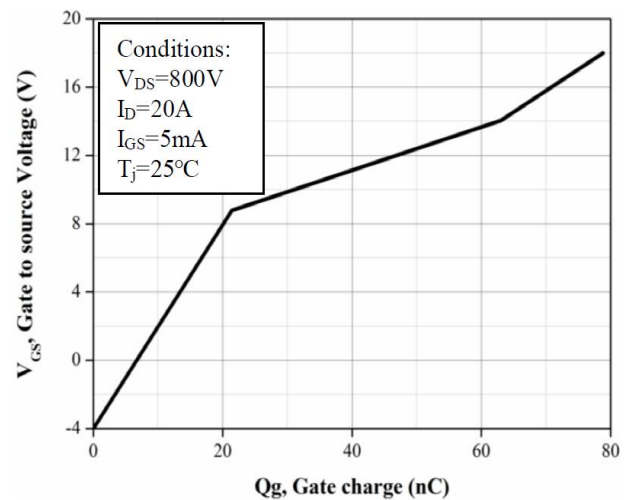


Figure 12. Gate Charge Characteristic

Typical Characteristics

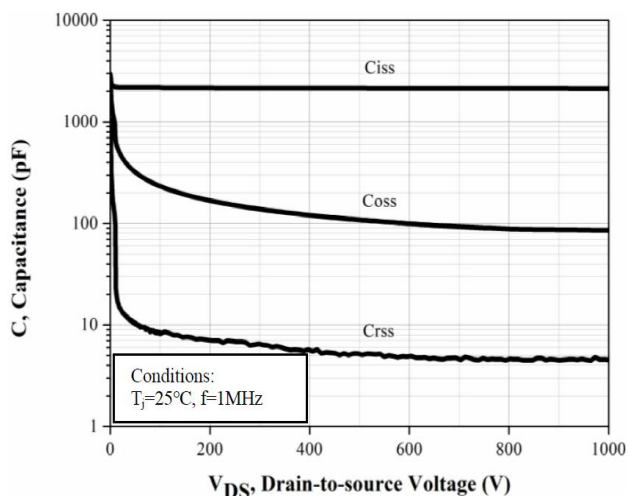


Figure 13. Capacitances vs. Drain Source Voltage (0-1000V)

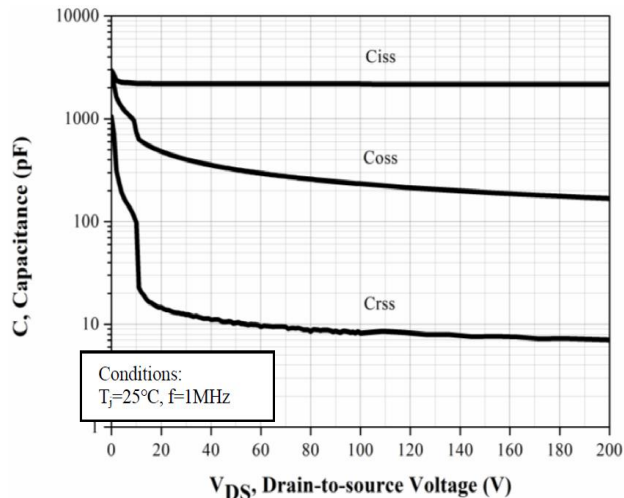


Figure 14. Capacitances vs. Drain Source Voltage (0-200V)

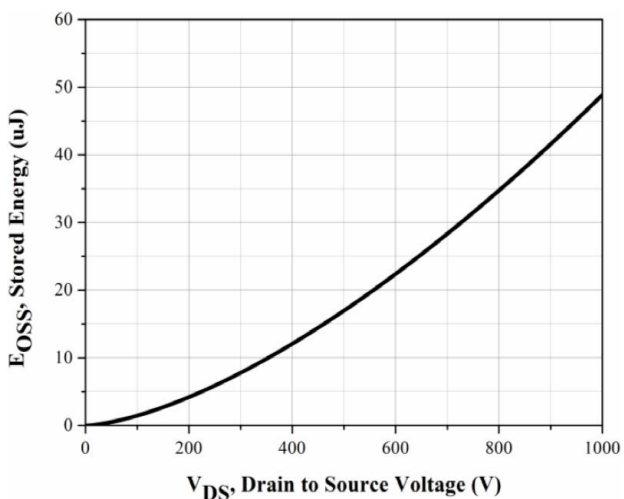


Figure 15. Output Capacitor Stored Energy

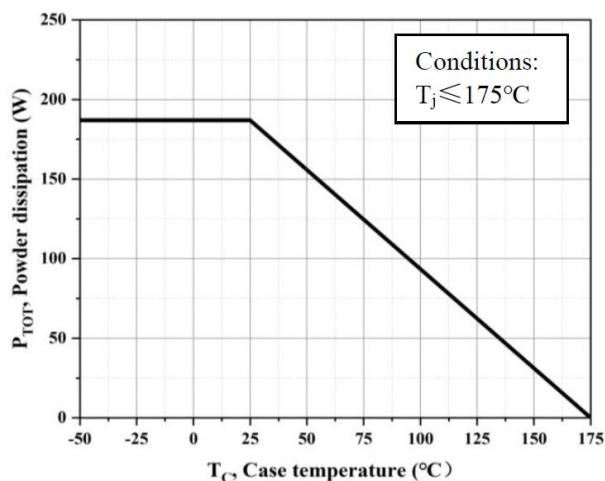


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

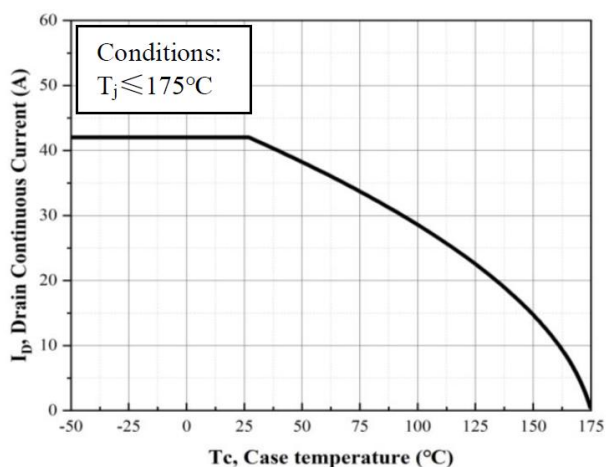


Figure 17. Continuous Drain Current Derating vs. Case Temperature

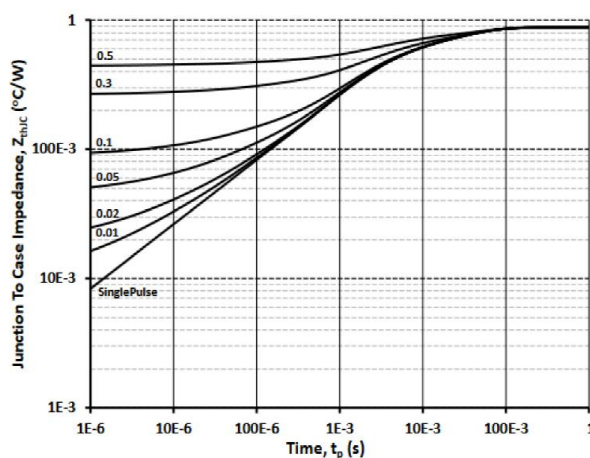


Figure18 Transient Thermal Impedance (Junction - Case)

Typical Characteristics

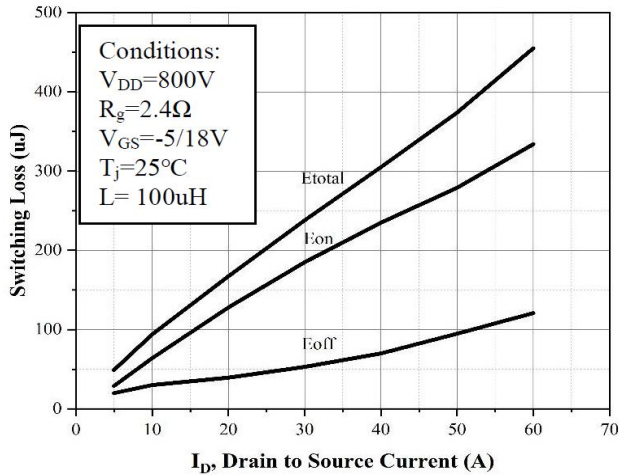


Figure 19. Clamped Inductive Switching Energy vs. Drain Current

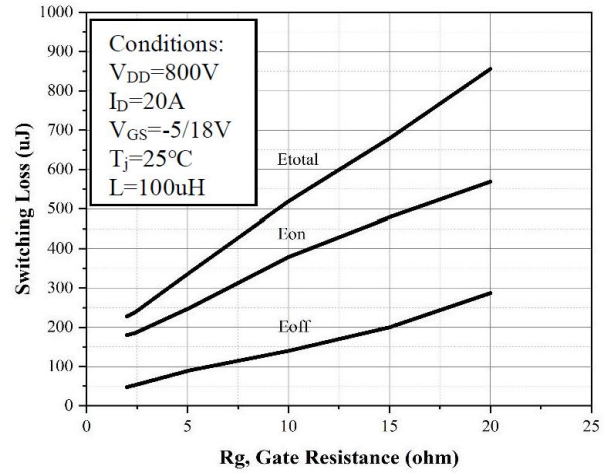


Figure 20. Clamped Inductive Switching Energy vs. R_g

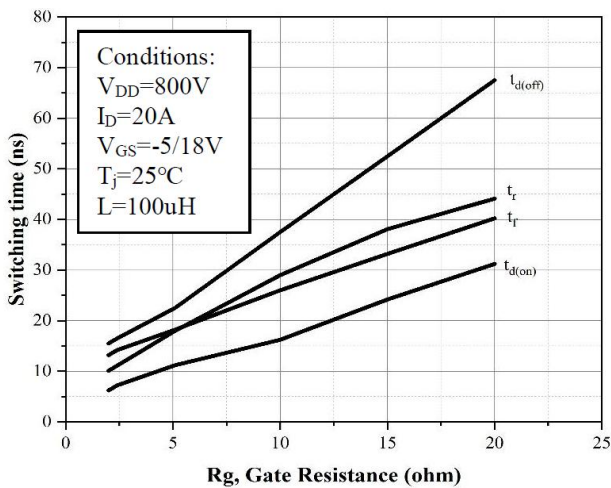


Figure 21. Switching Times vs. R_g

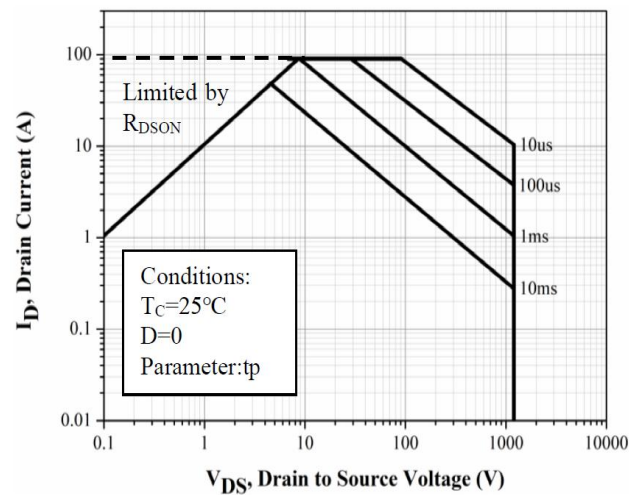


Figure 22. Safe Operating Area

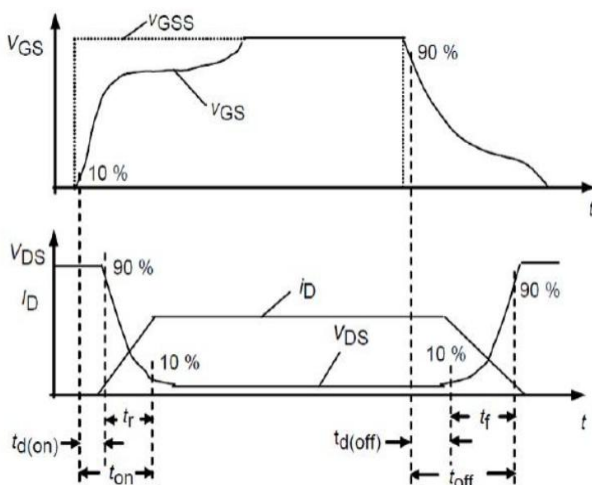


Figure 23. Switching Times Definition

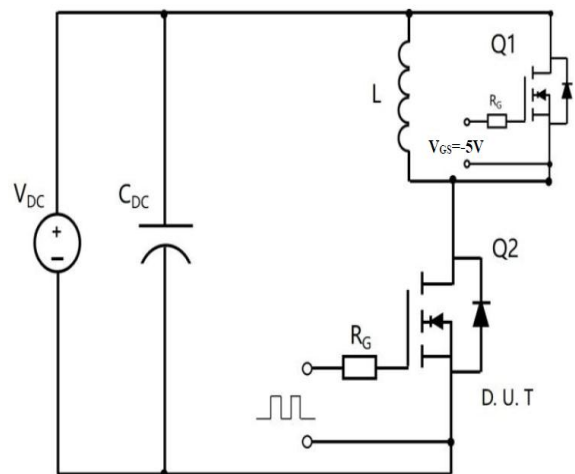
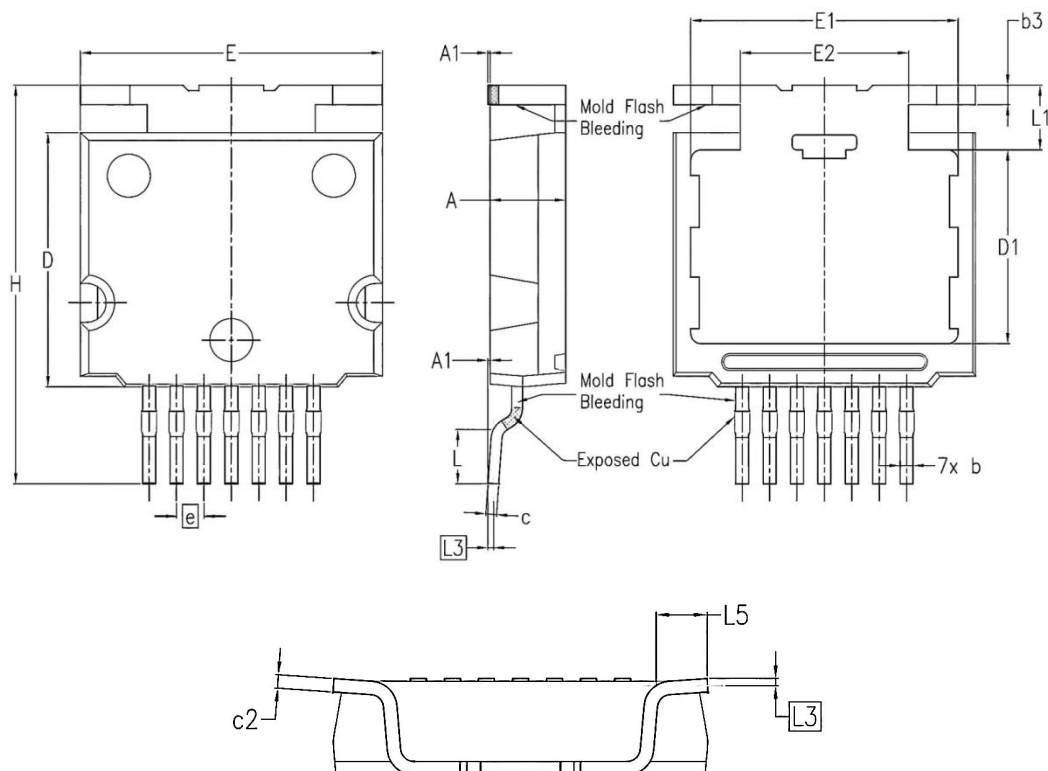


Figure 24. Clamped Inductive Switching Waveform Test Circuit

T2PAK Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	0.000	0.250	0.000	0.010
b	0.500	0.700	0.020	0.028
b3	0.800	1.000	0.031	0.039
c	0.400	0.600	0.016	0.024
c2	0.400	0.600	0.016	0.024
D	11.700	11.900	0.461	0.469
D1	8.800	9.200	0.346	0.362
E	13.600	14.400	0.535	0.567
E1	12.000	12.800	0.472	0.504
E2	7.600	8.000	0.299	0.315
e	1.270 BSC.		0.050 BSC.	
H	17.700	19.300	0.697	0.760
L	1.900	3.100	0.075	0.122
L1	2.850	3.350	0.112	0.132
L3	0.250 BSC.		0.010 BSC.	
L5	1.250	2.450	0.049	0.096