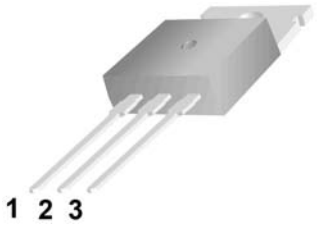
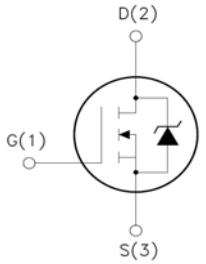
TO-220

RoHS COMPLIANT



Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 50nC (Typ.).
- ☐ BVDSS=60V,I_D=53A
- ☐ R_{DS}(on) : 0.015 Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested



1.Gate (G)
2.Drain (D)
3.Sourse (S)

Absolute Maximum Ratings* **(Tc=25℃ Unless otherwise noted)**

Symbol	PARAMETER		Value	Unit
V_{DSS}	Drain-Source Voltage		60	V
I_D	Drain Current	T_C=25℃	53	A
		T_C=100℃	35.4	
V_{GSS}	Gate Threshold Voltage		±20	V
E_{AS}	Single Pulse Avalanche Energy (note1)		300	mJ
I_{AR}	Avalanche Current (note2)		50	A
P_D	Power Dissipation (Tc=25℃)		85	W
T_j	Junction Temperature(MAX)		175	℃
T_{stg}	Storage Temperature		-55~+175	℃
TL	Maximum lead temperature for soldering purpose,1/8" from case for 5 seconds		300	℃

Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
$R_{\theta JC}$	Thermal Resistance,Junction to Case	-	1.8	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	-	-	℃/W
$R_{\theta CS}$	Thermal Resistance,Case to Sink	-	110	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	-	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	12	15	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=20A	18	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	2050	-	PF
Output Capacitance	C_{oss}		-	158	-	PF
Reverse Transfer Capacitance	C_{rss}		-	120	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, R_L=6.7Ω V_{GS}=10V,R_G=3Ω	-	7.4	-	nS
Turn-on Rise Time	t_r		-	5.1	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28.2	-	nS
Turn-Off Fall Time	t_f		-	5.5	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=20A, V_{GS}=10V	-	50		nC
Gate-Source Charge	Q_{gs}		-	6		nC
Gate-Drain Charge	Q_{gd}		-	15		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	53	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =20A di/dt = 100A/μs (Note3)	-	28	-	nS
Reverse Recovery Charge	Qrr		-	40	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,VDD=30V,VG=10V,L=0.5mH,Rg=25Ω

Typical Characteristics

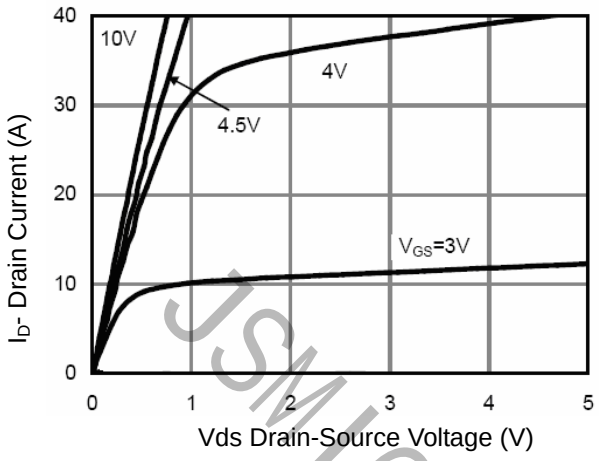


Figure 1 Output Characteristics

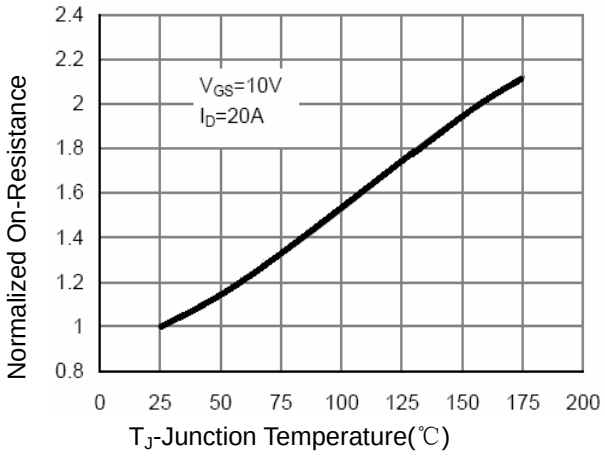


Figure 4 Rdson-Junction Temperature

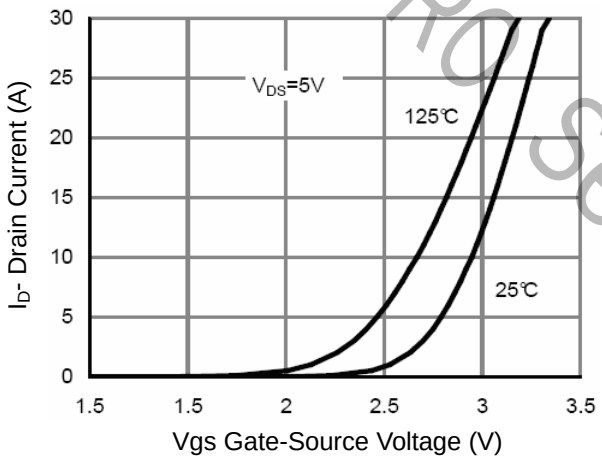


Figure 2 Transfer Characteristics

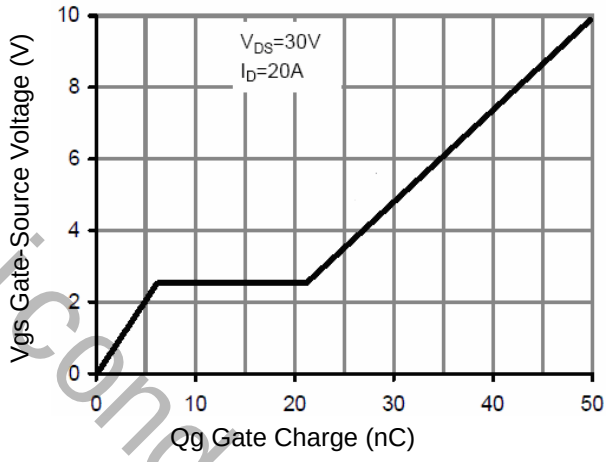


Figure 5 Gate Charge

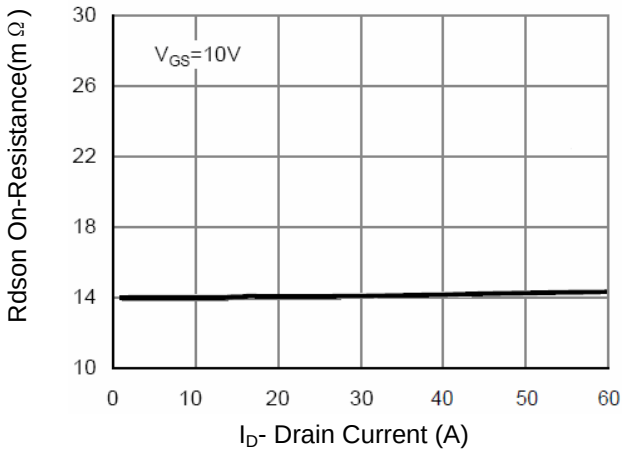


Figure 3 Rdson- Drain Current

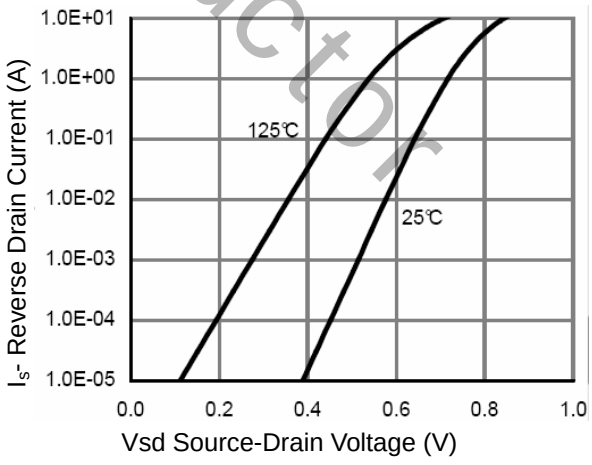


Figure 6 Source- Drain Diode Forward

Typical Characteristics (Continued)

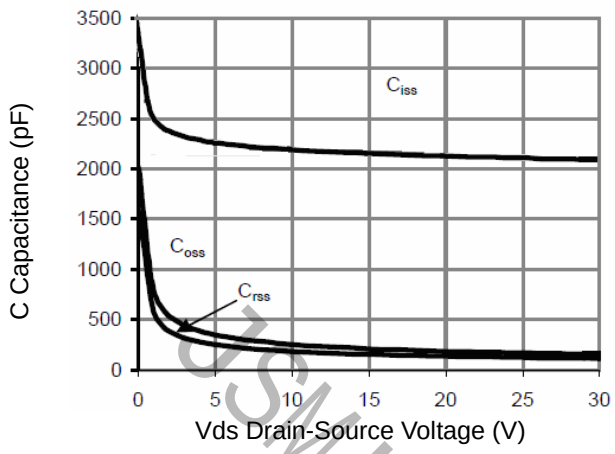


Figure 7 Capacitance vs Vds

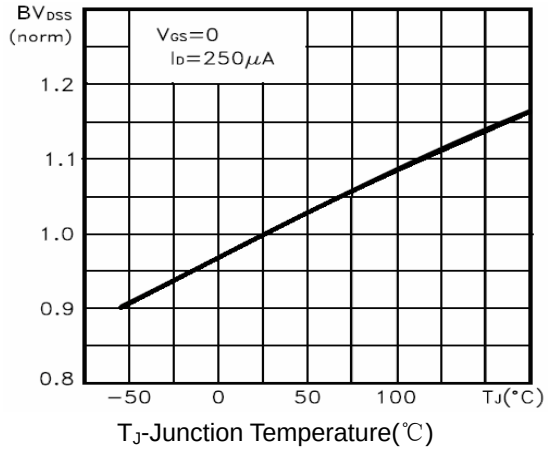


Figure 9 BV_{DSS} vs Junction Temperature

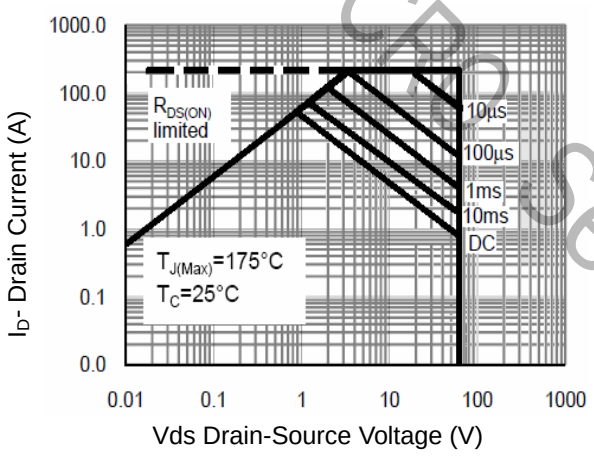


Figure 8 Safe Operation Area

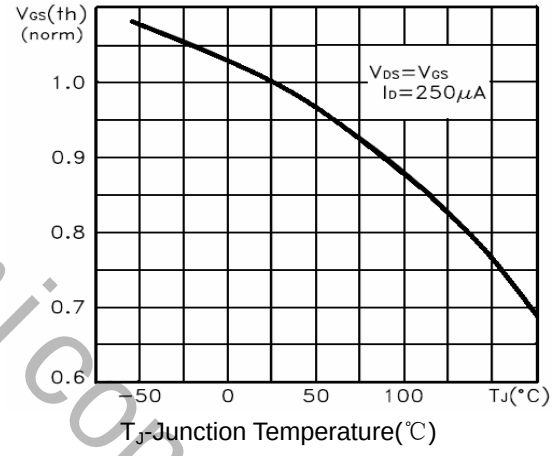


Figure 10 $V_{GS(th)}$ vs Junction Temperature

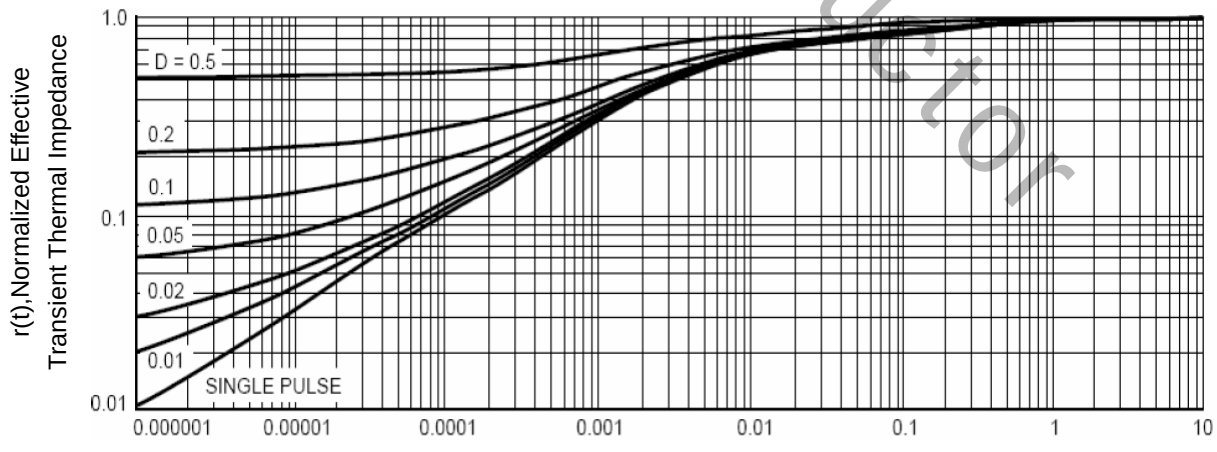
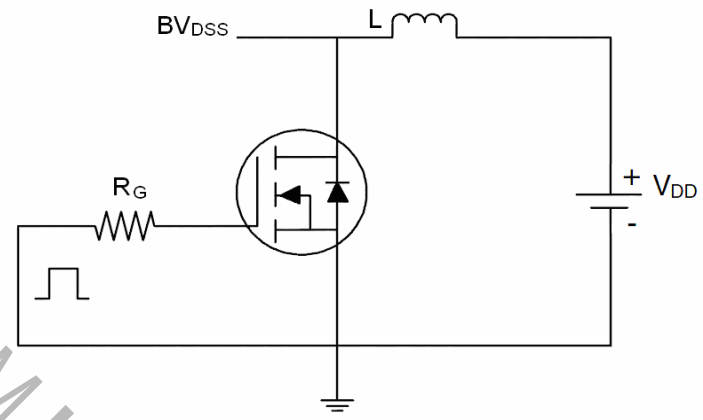


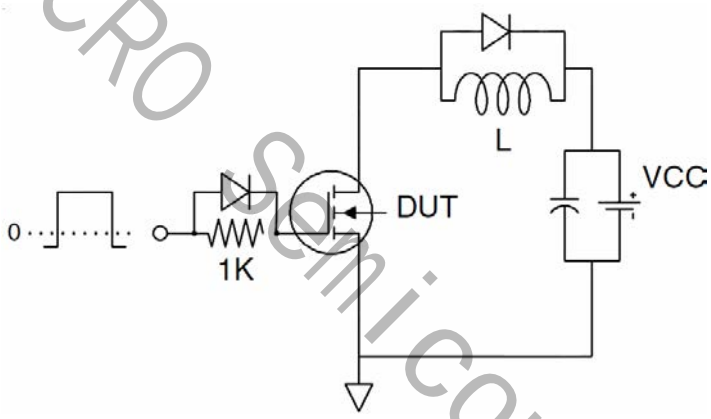
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

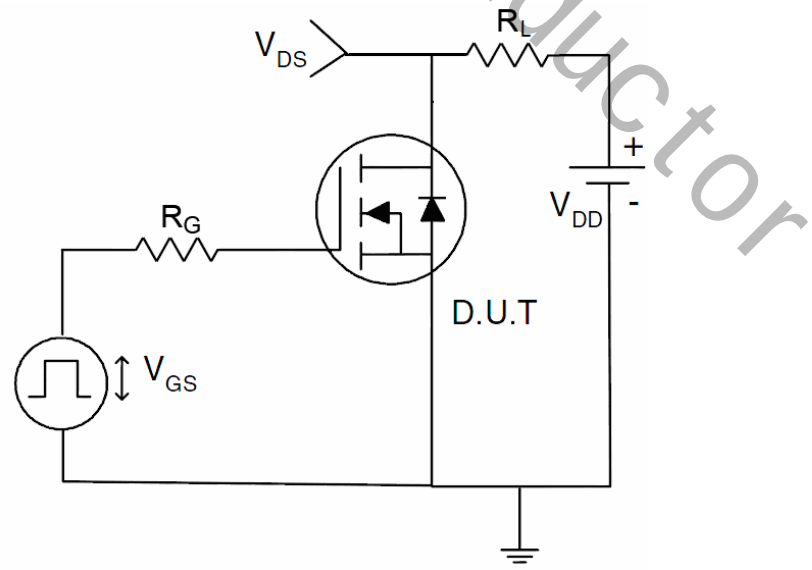
1) $_{AS}$ test Circuit



2) Gate c rge test Circuit



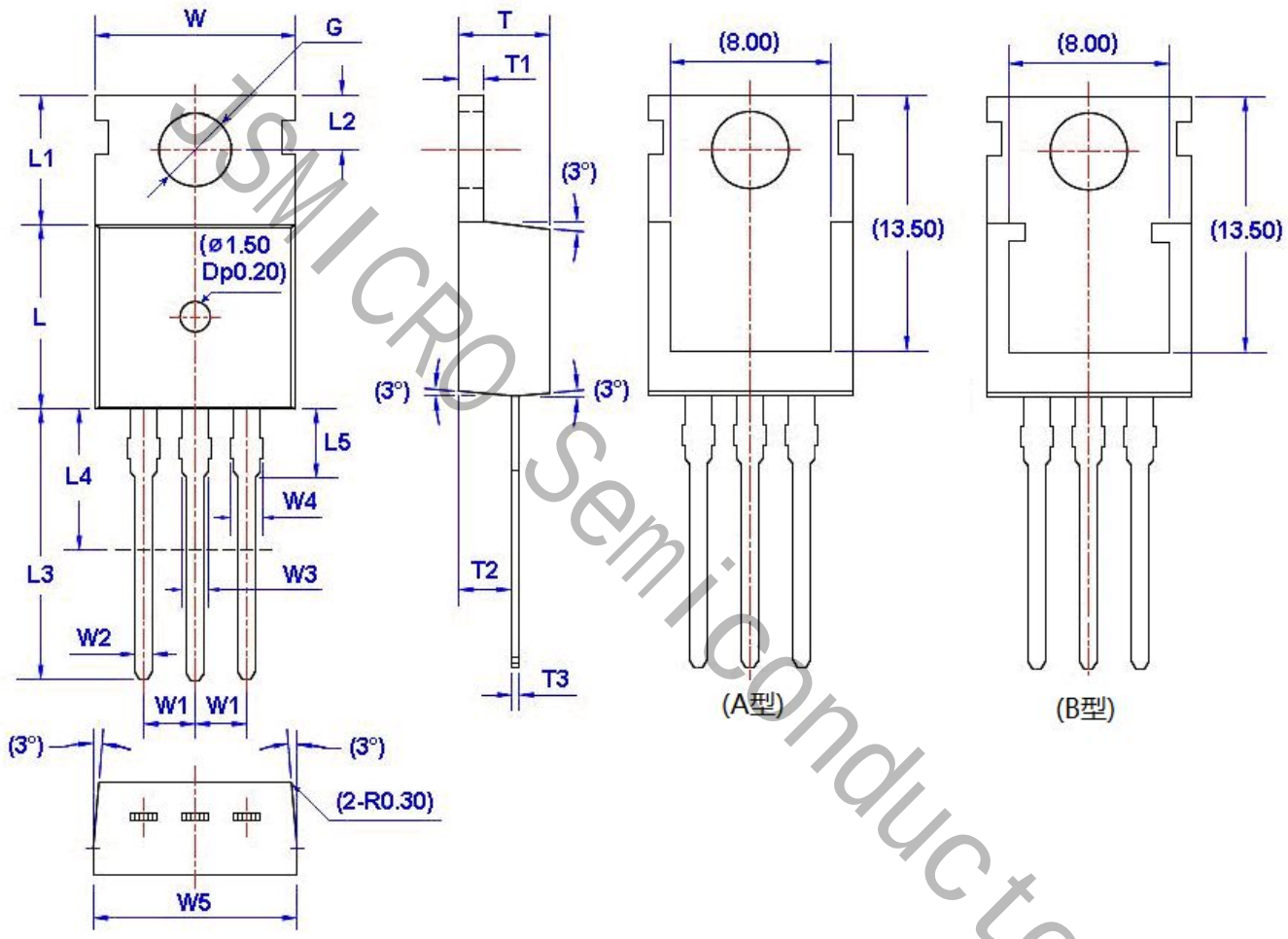
3) witch Time Test Circuit



Package Dimension

TO-220

Unit:mm



Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.66	10.28	W5	9.80	10.20	L4**	6.20	6.60	T3	0.45	0.60
W1	2.54（TYP）		L	9.00	9.40	L5	2.79	3.30	G(Φ)	3.50	3.70
W2	0.70	0.95	L1	6.40	6.80	T	4.30	4.70			
W3	1.17	1.37	L2	2.70	2.90	T1	1.15	1.40			
W4*	1.32	1.72	L3	12.70	14.27	T2	2.20	2.60			