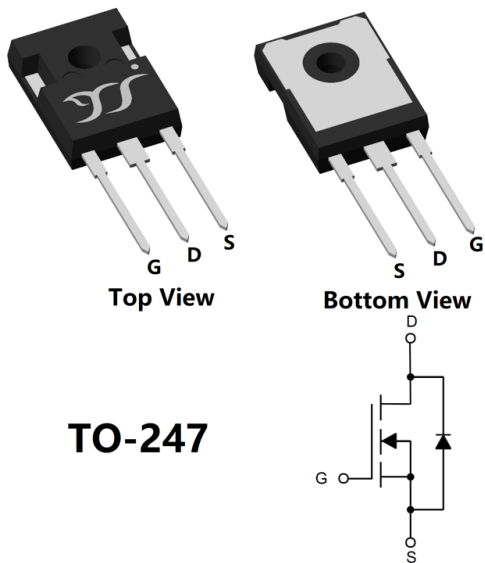


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

• V_{DS}	250V
• I_D	51A
• $R_{DS(ON)}$ (at $V_{GS}=10V$)	$<43m\Omega$
• 100% EAS Tested	
• 100% ∇V_{DS} Tested	

General Description

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power switching application
- DC-DC convertor
- Uninterruptible power supply

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V_{DS}	-	250	V
Gate-source Voltage			V_{GS}	-20	20	
Continuous Drain Current (Note 1,2)	Steady-State	$T_A=25^{\circ}C, V_{GS}=10V$	I_D	-	5.1	A
		$T_A=100^{\circ}C, V_{GS}=10V$		-	3.2	
Continuous Drain Current (Note 1,3)	Steady-State	$T_C=25^{\circ}C, V_{GS}=10V, \text{Chip limitation}$		-	51	
		$T_C=100^{\circ}C, V_{GS}=10V$		-	32.2	
Pulsed Drain Current	$T_C=25^{\circ}C, t_p \leq 10\mu s$		I_{DM}	-	204	
Maximum Body-Diode Continuous Current	$T_C=25^{\circ}C$		I_S		51	
Avalanche Energy (non-repetitive)	$T_J=25^{\circ}C, V_G=10V, R_G=25\Omega, L=1mH, I_{AS}=39.2A$		EAS	-	768.3	mJ
Total Power Dissipation (Note 1,2)	Steady-State	$T_A=25^{\circ}C$	P_D	-	3.12	W
		$T_A=100^{\circ}C$		-	1.25	
Total Power Dissipation (Note 1,3)	Steady-State	$T_C=25^{\circ}C$		-	312.5	
		$T_C=100^{\circ}C$		-	125	
Junction and Storage Temperature Range			T_J, T_{STG}	-55	150	$^{\circ}C$

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	40	$^{\circ}C/W$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	0.4	



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■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =250μA,T _J =25°C	250	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =250V,V _{GS} =0V,T _J =25°C	-	-	1	μA
		V _{DS} =250V,V _{GS} =0V,T _J =125°C	-	-	100	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V,T _J =25°C	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA,T _J =25°C	3.2	4	4.8	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V,I _D =40A,T _J =25°C	-	33	43	mΩ
Diode Forward Voltage	V _{SD}	I _S =40A,V _{GS} =0V,T _J =25°C	-	0.84	1.2	V
Gate Resistance	R _G	f=1MHz,T _J =25°C	-	1.2	-	Ω
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =125V,V _{GS} =0V,f=1MHz,T _J =25°C	-	8552	-	pF
Output Capacitance	C _{oss}		-	212	-	
Reverse Transfer Capacitance	C _{rss}		-	55	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V,V _{DS} =125V,I _D =40A,T _J =25°C	-	130	-	nC
Gate-Source Charge	Q _{gs}		-	48.4	-	
Gate-Drain Charge	Q _{gd}		-	34.5	-	
Reverse Recovery Charge	Q _{rr}	I _F =40A,di/dt=100A/μs,V _{GS} =0V, V _R =125V,T _J =25°C	-	1786	-	nC
Reverse Recovery Time	t _{rr}		-	197	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V,V _{DS} =125V,I _D =40A,R _{GEN} =3Ω, T _J =25°C	-	35.4	-	ns
Turn-on Rise Time	t _r		-	66.5	-	
Turn-off Delay Time	t _{D(off)}		-	59.7	-	
Turn-off Fall Time	t _f		-	15	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).



■ Typical Electrical and Thermal Characteristics Diagrams

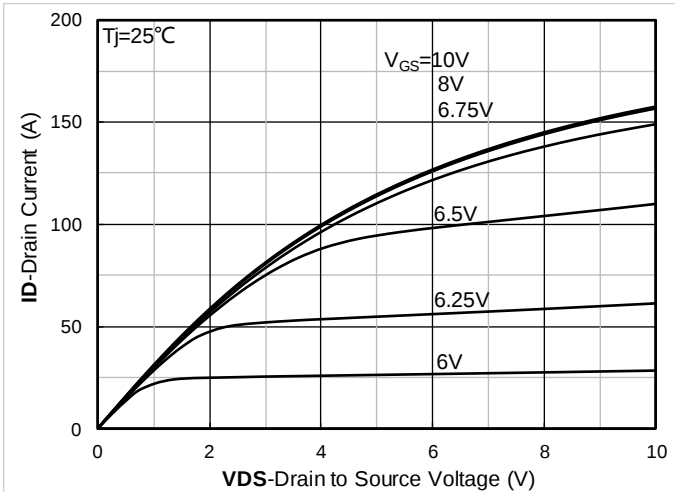


Figure 1. Output Characteristics; typical values

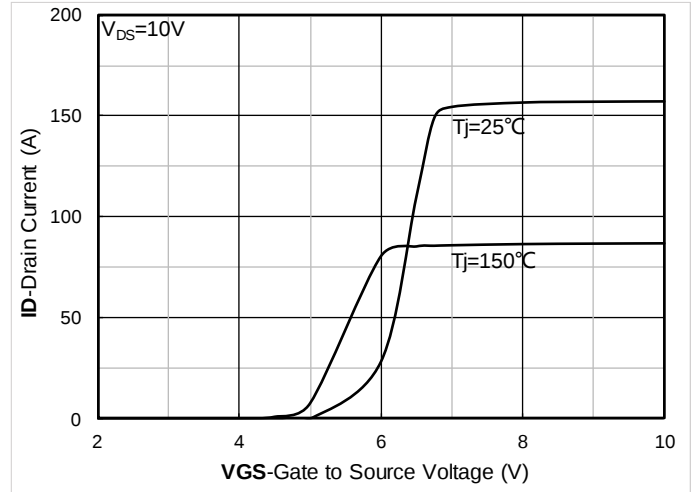


Figure 2. Transfer Characteristics; typical values

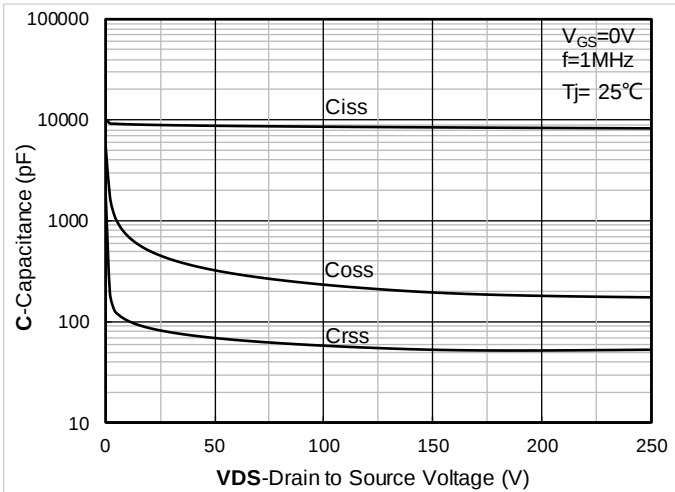


Figure 3. Capacitance Characteristics; typical values

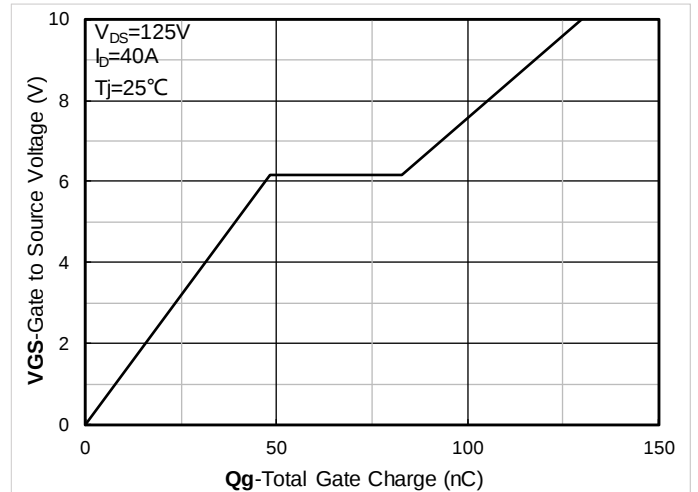


Figure 4. Gate Charge; typical values

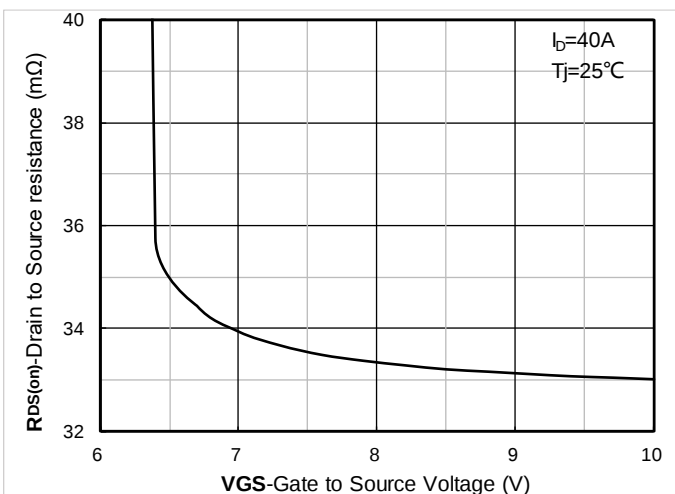


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

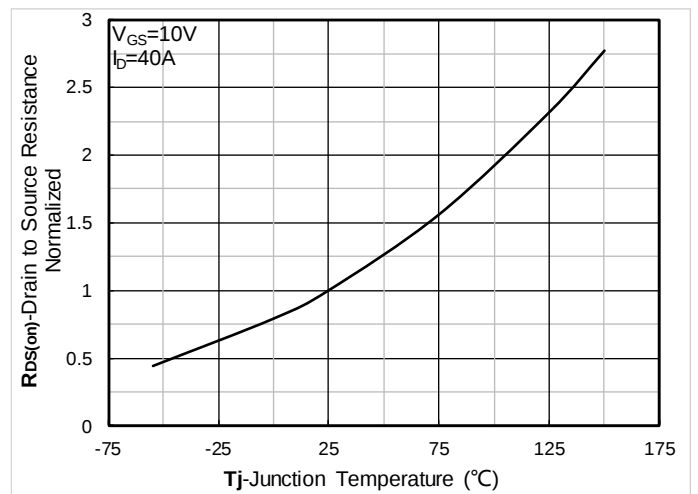


Figure 6. Normalized On-Resistance

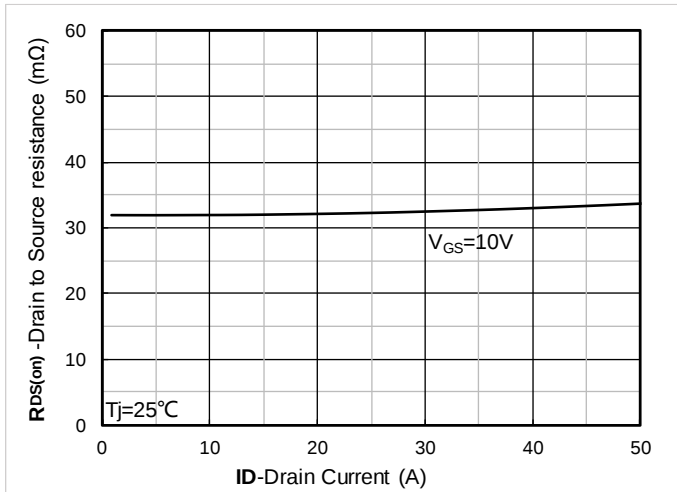


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

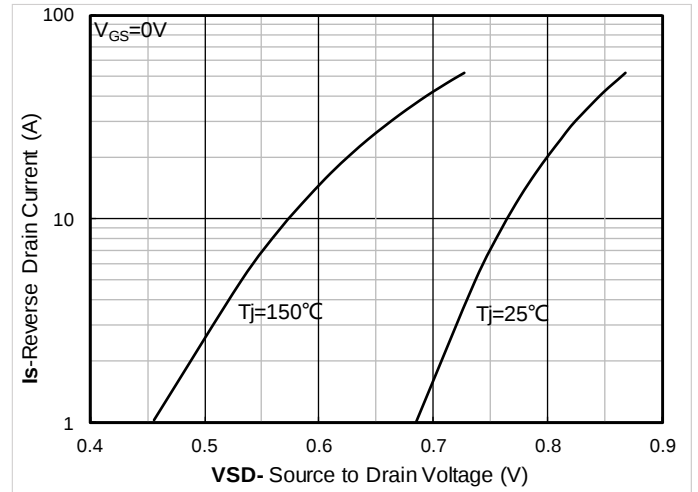


Figure 8. Forward characteristics of reverse diode; typical values

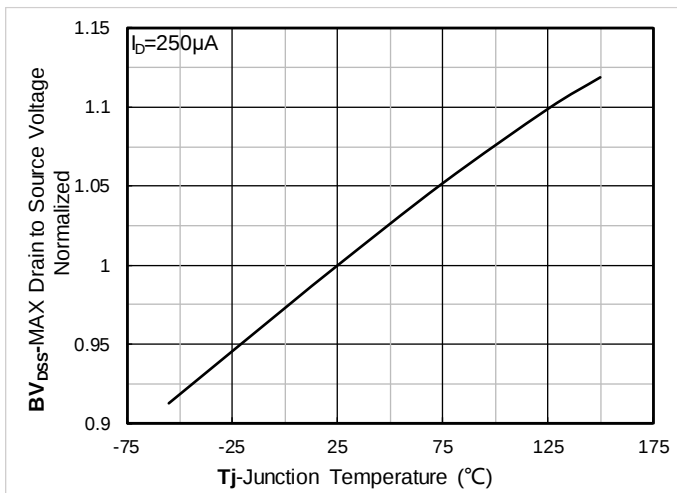


Figure 9. Normalized breakdown voltage

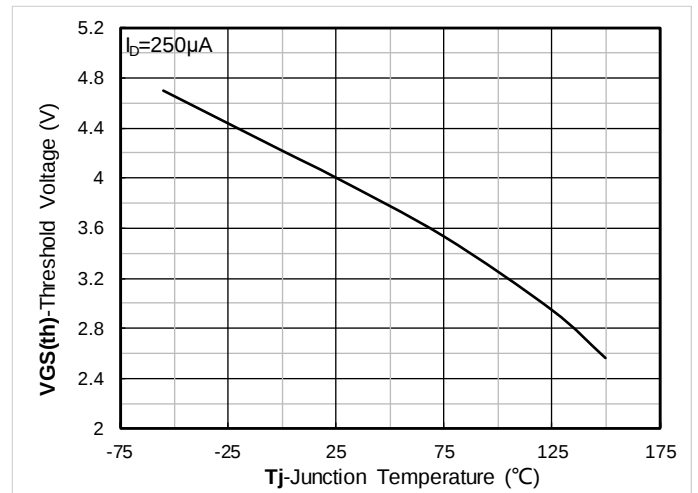


Figure 10. Gate Threshold voltage; typical values

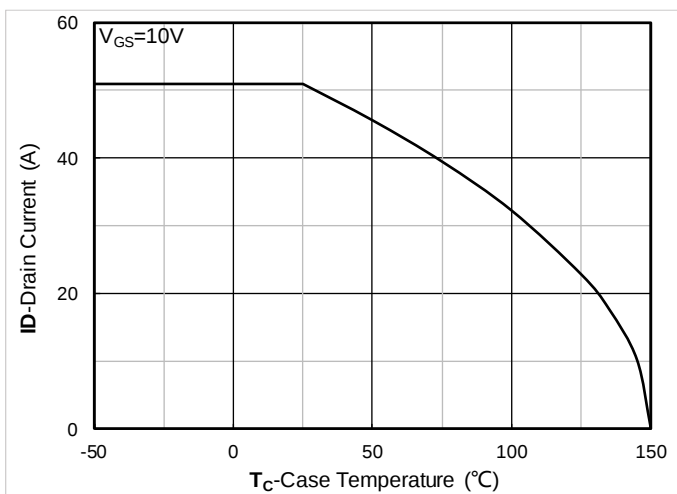


Figure 11. Current dissipation

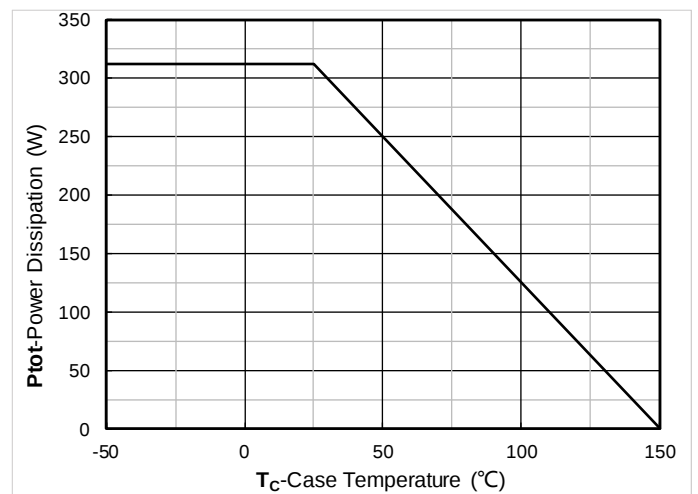


Figure 12. Power dissipation

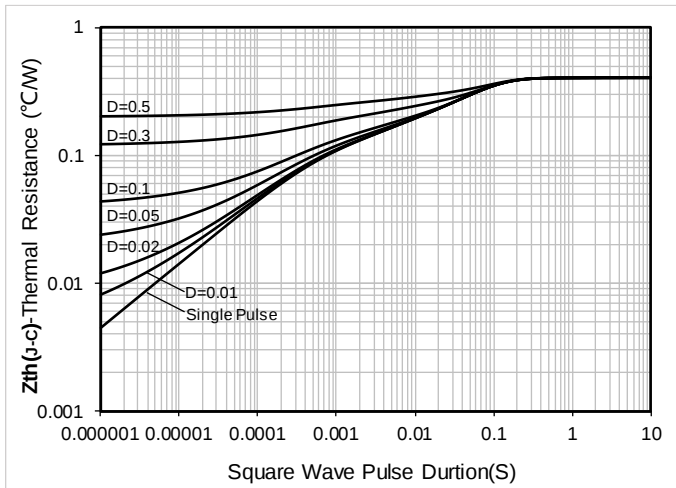


Figure 13. Maximum Transient Thermal Impedance

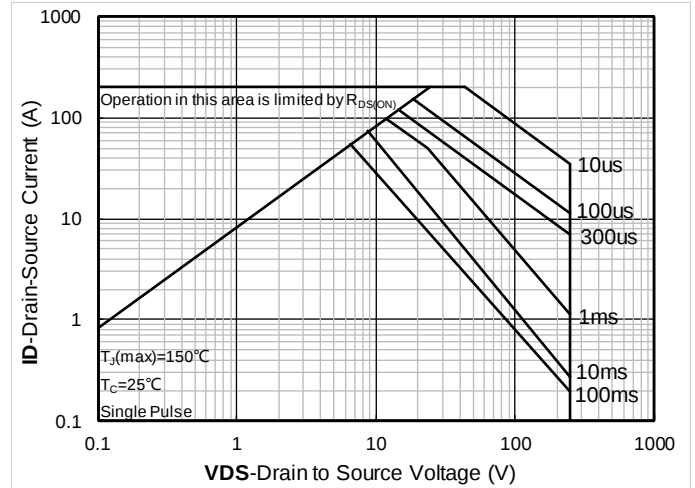
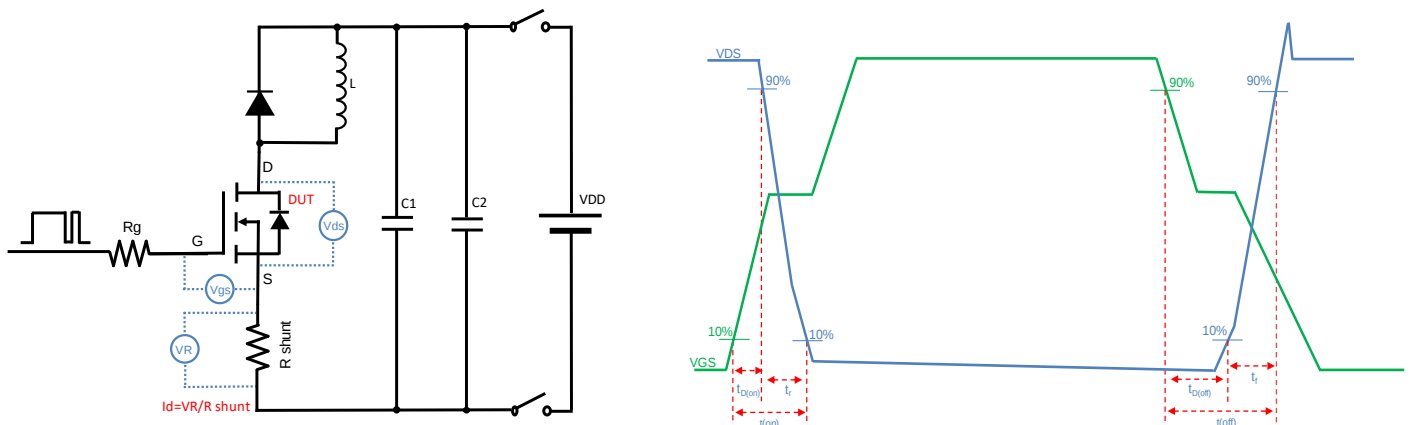
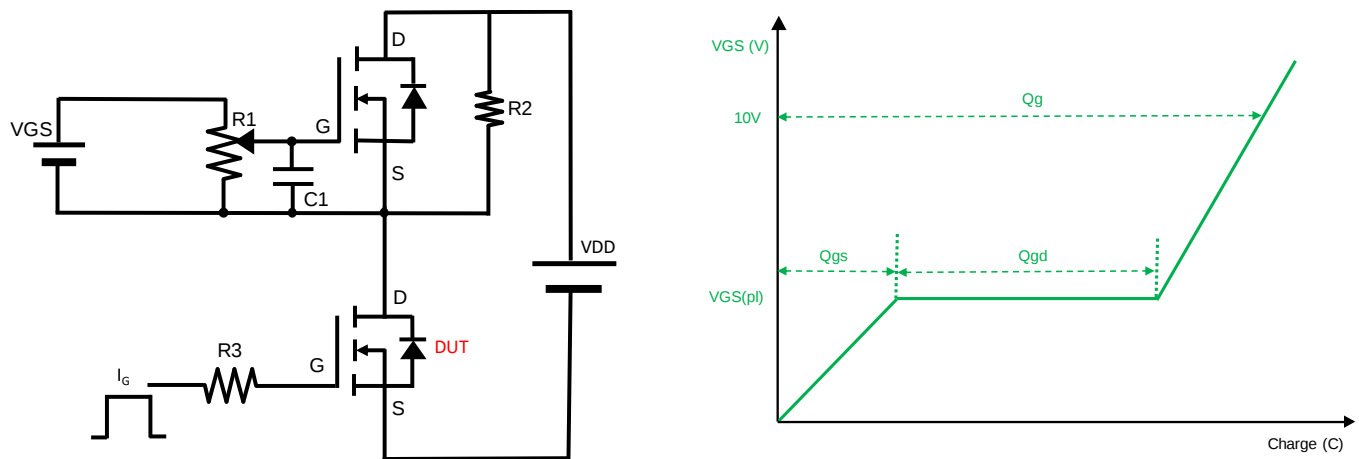
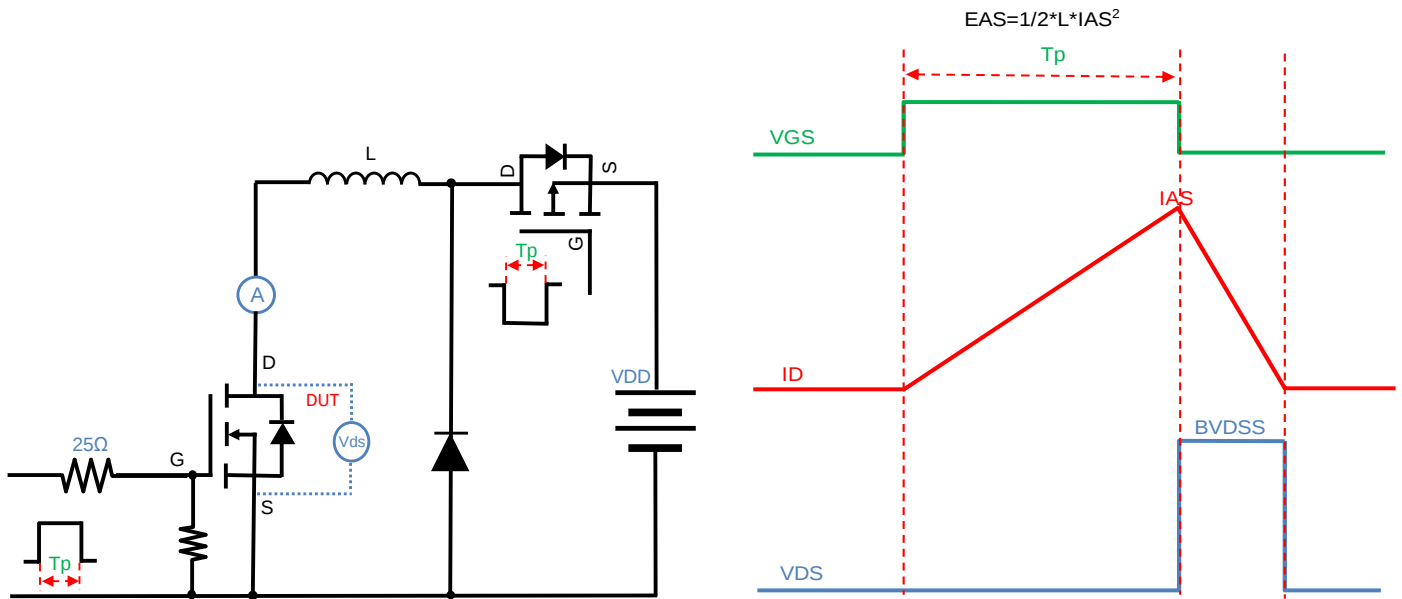


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms



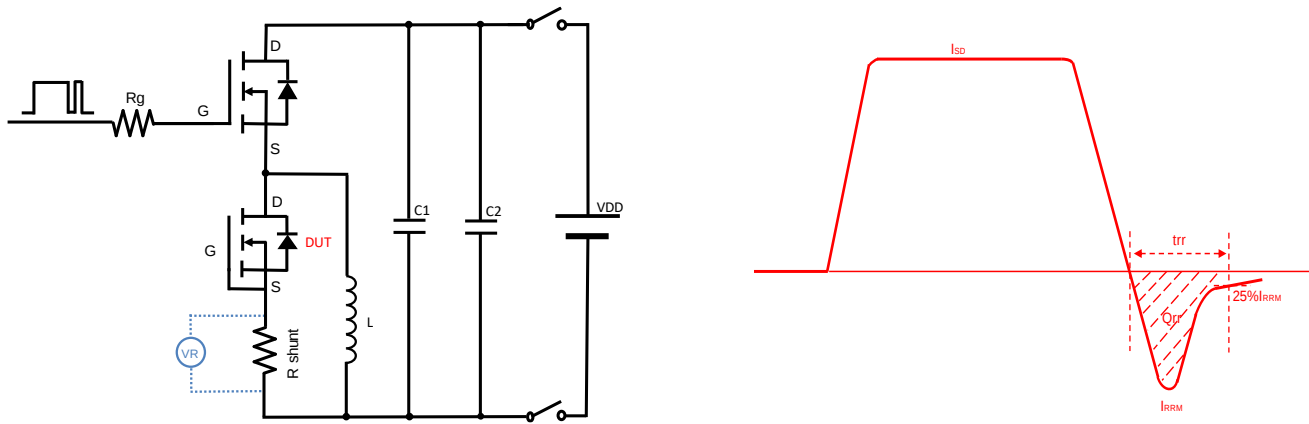
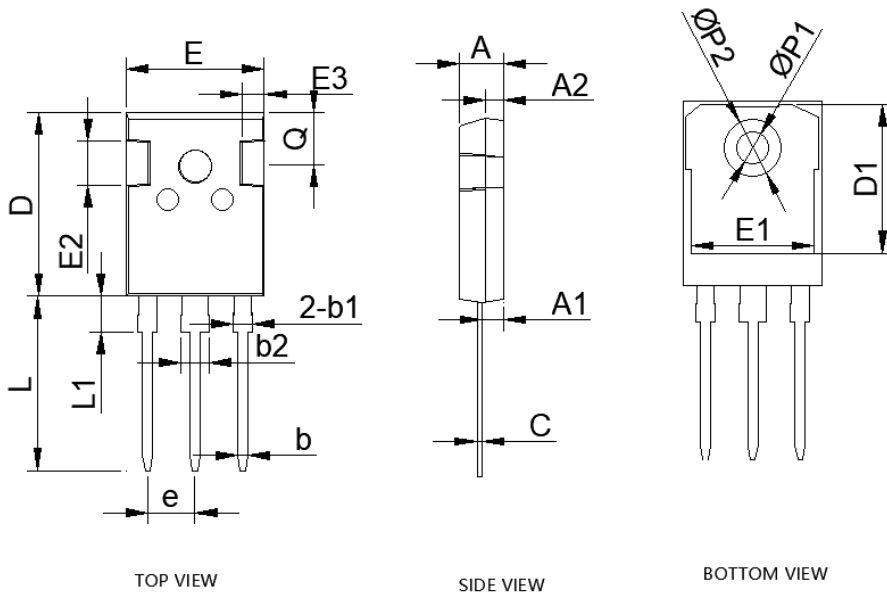


Figure D. Diode Recovery Test Circuit & Waveform



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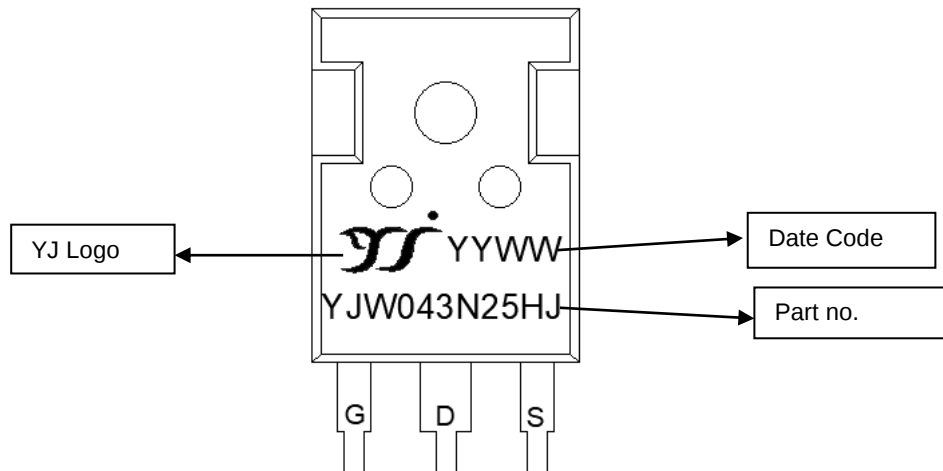
■ TO-247-B Package information



SYMBOL	INCHES		MILLIMETER	
	MIN.	MAX.	MIN.	MAX.
A	0.189	0.205	4.800	5.200
A1	0.087	0.103	2.210	2.610
A2	0.073	0.085	1.850	2.150
b	0.039	0.055	1.000	1.400
b1	0.075	0.091	1.900	2.300
b2	0.114	0.130	2.900	3.300
C	0.020	0.028	0.500	0.700
D	0.815	0.839	20.700	21.300
D1	0.640	0.663	16.250	16.850
D2	0.039	0.055	1.000	1.400
E	0.610	0.634	15.500	16.100
E1	0.512	0.535	13.000	13.600
E2	0.189	0.205	4.800	5.200
E3	0.091	0.106	2.300	2.700
e	0.211	0.217	5.350	5.500
L	0.772	0.796	19.620	20.220
L1	-	0.169	-	4.300
ØP1	0.134	0.000	3.400	3.800
ØP2	0.276	0.281	7.000	7.400
Q	0.217	0.240	5.500	6.100

NOTE:
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.

■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. YJW043N25HJ is part no., YYWW is date code, "YY" is year, "WW" is week
4. Body color: Black



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