

N-channel Enhancement Mode Power MOSFET

Features

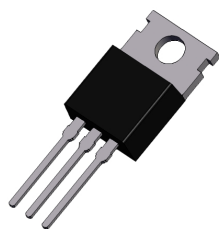
- Halogen-free and RoHS-compliant
- Ultra-low RDS(ON)
- Lead free product is acquired
- 100% UIS TESTED
- 100% Rg TESTED

Applications

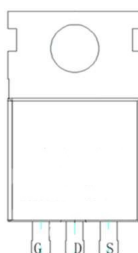
- Load Switch
- PWM Application
- Power Management

Product Summary

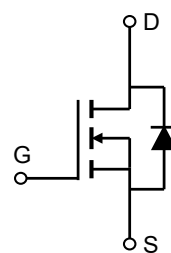
Parameters	Value	Unit
V_{DSS}	100	V
$V_{GS(th_Typ)}$	1.7	V
$I_D(@V_{GS}=10V)$	88	A
$R_{DS(ON)_Typ}(@V_{GS}=10V)$	5.8	mΩ
$R_{DS(ON)_Typ}(@V_{GS}=4.5V)$	7.6	mΩ



TO-220C Top View



Marking



Schematic Diagram

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK100G08P	100G08	TO-220	Pipe	N/A	N/A	1000

MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	88	A
		62	
Pulsed Drain Current	I_{DM}	Refer to Fig.4	A
Single Pulsed Avalanche Energy	E_{AS}	238	mJ
Power Dissipation	P_D	111	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^{\circ}\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	V _{(BR) DSS}	V _{GS} = 0V, I _D = 250uA	100			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 80V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±20V			±100	nA
On characteristics ④						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.2	1.7	2.5	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		5.8	6.9	mΩ
		V _{GS} =4.5V, I _D =20A		7.6	9.9	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =50V,V _{GS} =0V f =1MHz		2615		pF
Output capacitance	C _{oss}			806		
Reverse transfer capacitance	C _{rss}			22		
Gate Resistance	R _g	f =1MHz		1.8		Ω
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =50V, I _D =20A		44		nC
Gate-source charge	Q _{gs}			9		
Gate-drain charge	Q _{gd}			9		
Turn-on delay time	t _{d(on)}	V _{DD} =50V,I _D =50A V _{GS} =10V,R _{GEN} =6.2Ω		11		ns
Turn-on rise time	t _r			18		
Turn-off delay time	t _{d(off)}			50		
Turn-off fall time	t _f			40		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD} ④	V _{GS} =0V, I _S =20A			1.2	V
Continuous drain-source diode forward current	I _S ①				88	A
Pulsed drain-source diode forward current	I _{SM} ②				352	A
Reverse recovery time	t _{rr}	di/dt = 100A/μs, I _F = 20A		49		ns
Reverse recovery charge	Q _{rr}			67		nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 50V$, $V_G = 10V$, $R_G = 25\Omega$, $L = 3mH$, $I_{AS} = 13A$
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
- 4.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Figure 1: Power De-rating

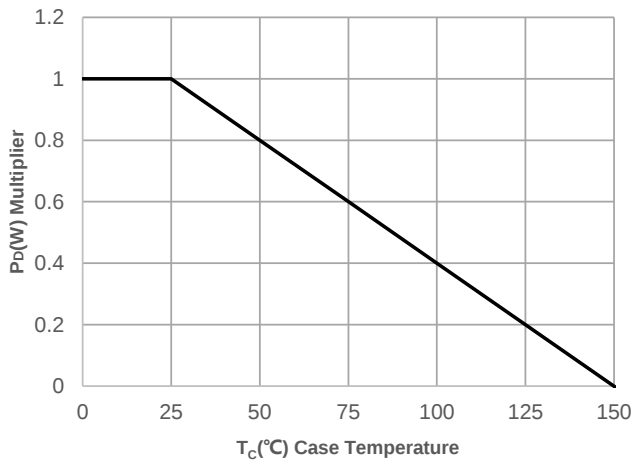


Figure 2: Current De-rating

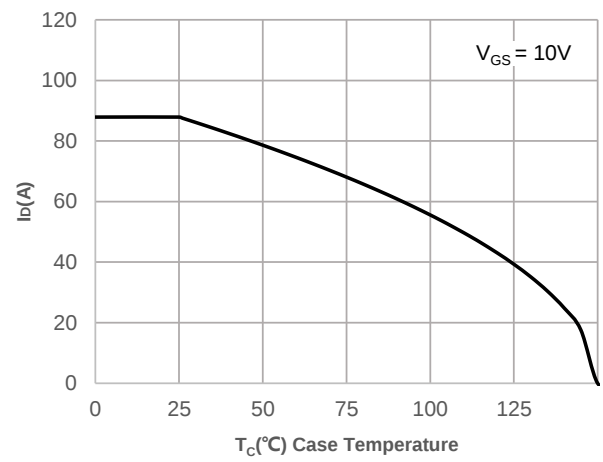


Figure 3: Normalized Maximum Transient Thermal Impedance

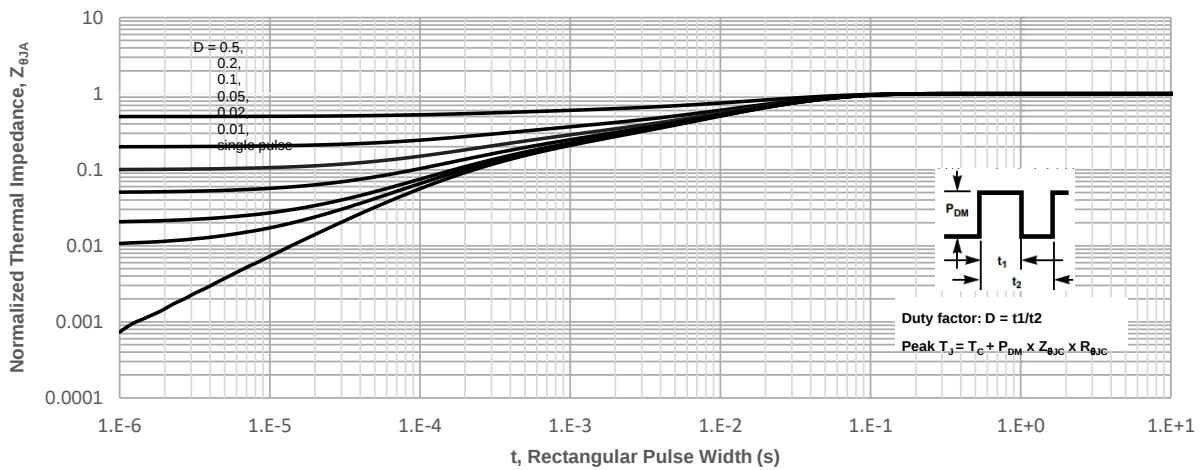
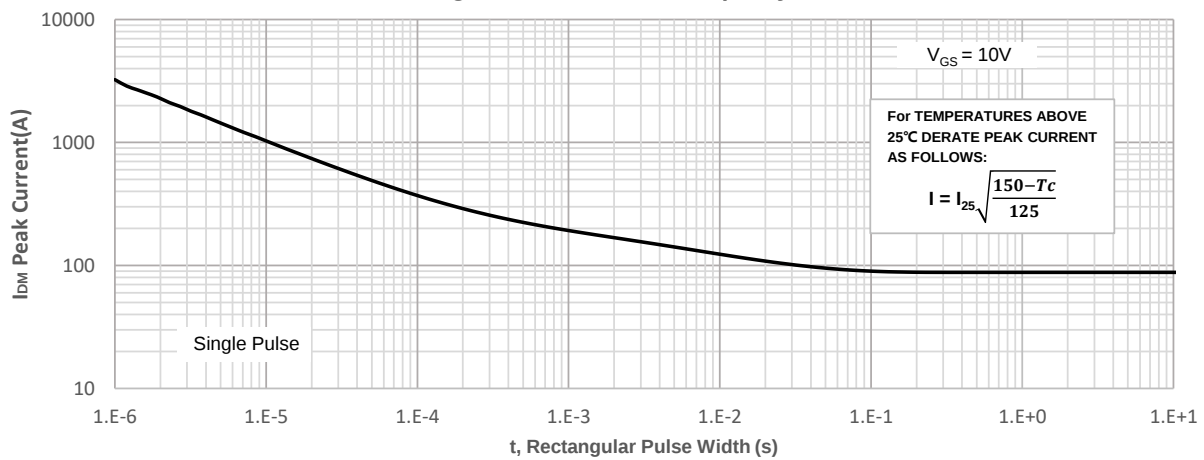


Figure 4: Peak Current Capacity



Typical Characteristics

Figure 5: Output Characteristics

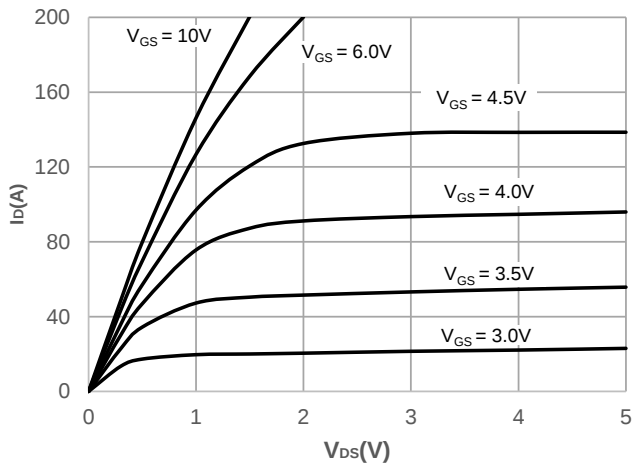


Figure 6: Typical Transfer Characteristics

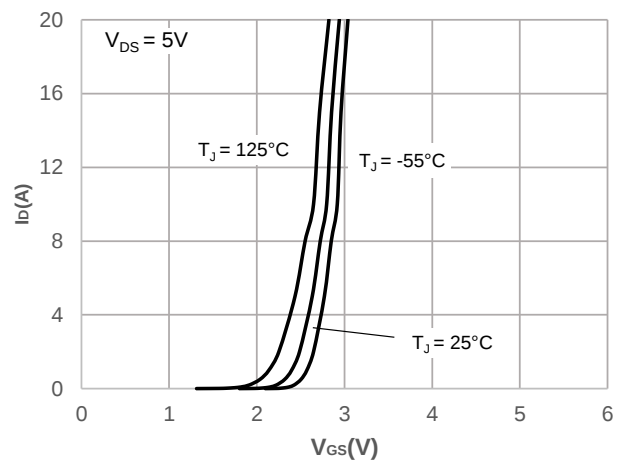


Figure 7: On-resistance vs. Drain Current

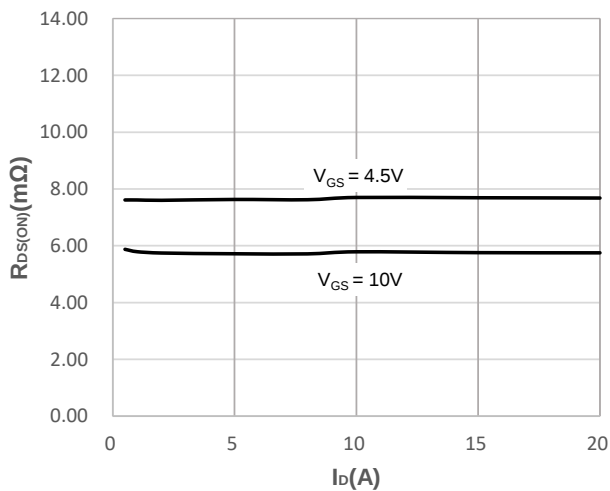


Figure 8: Body Diode Characteristics

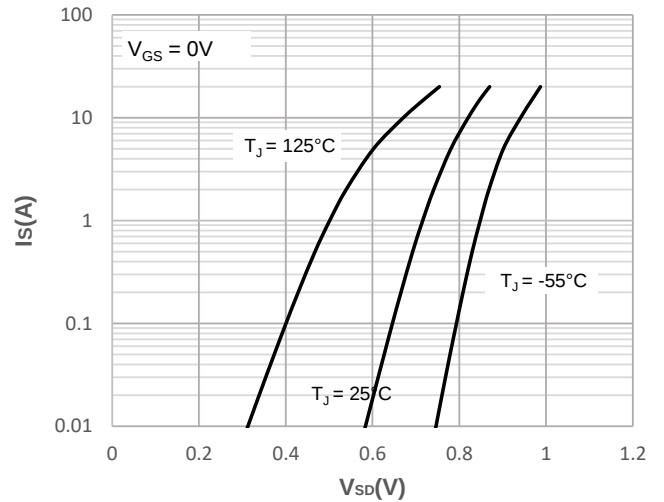


Figure 9: Gate Charge Characteristics

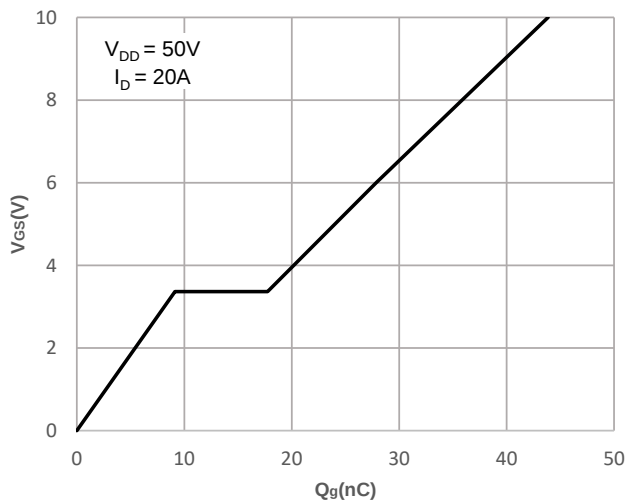
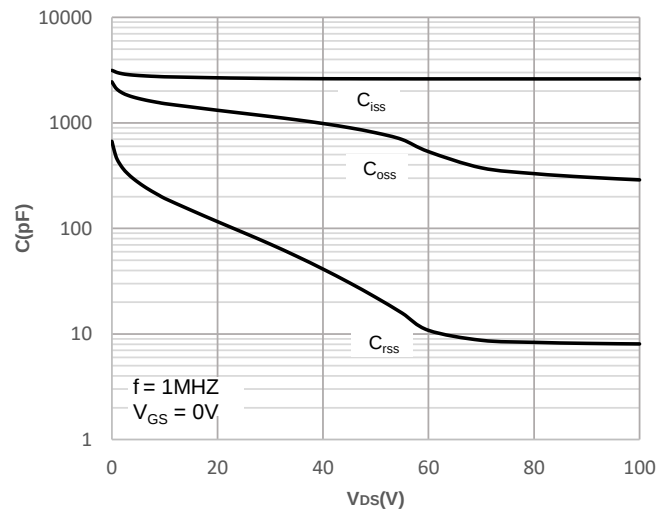


Figure 10: Capacitance Characteristics



Typical Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

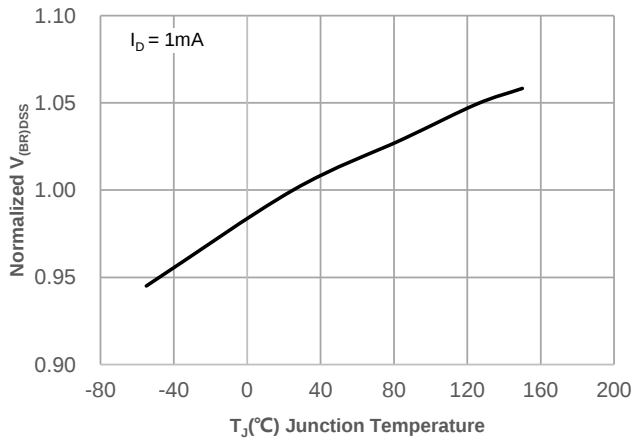


Figure 12: Normalized on Resistance vs. Junction Temperature

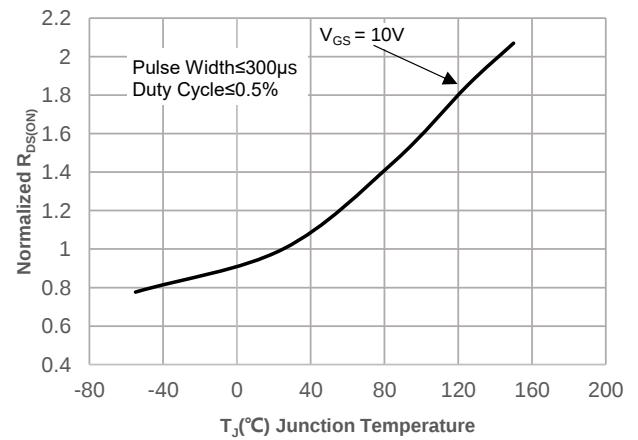


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

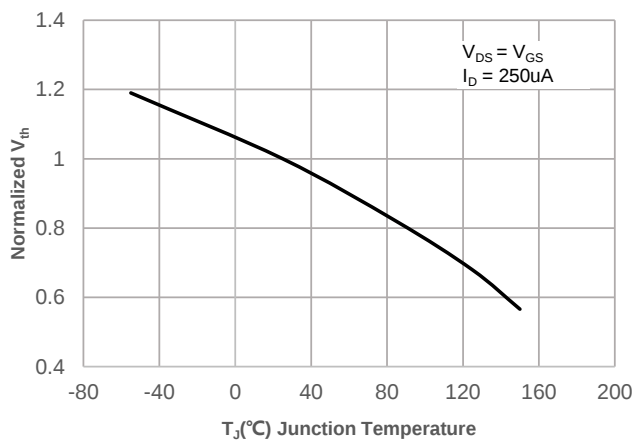


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

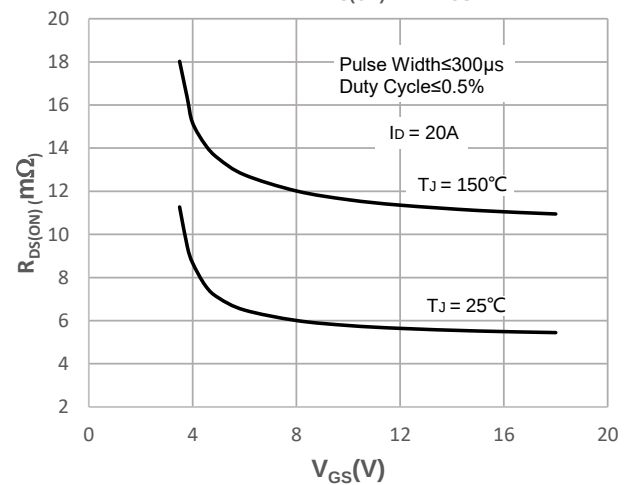
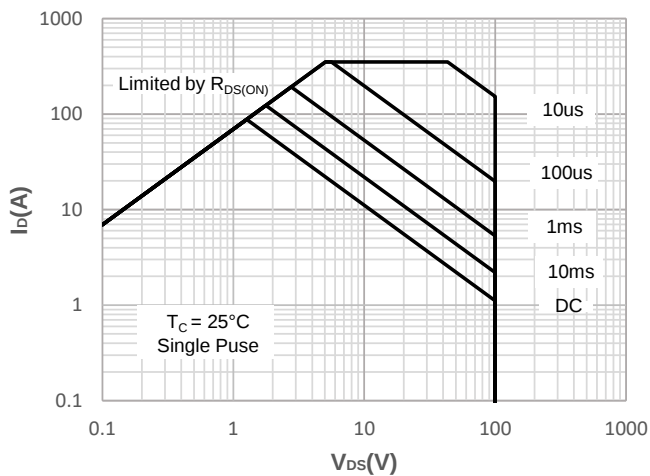


Figure 15: Maximum Safe Operating Area



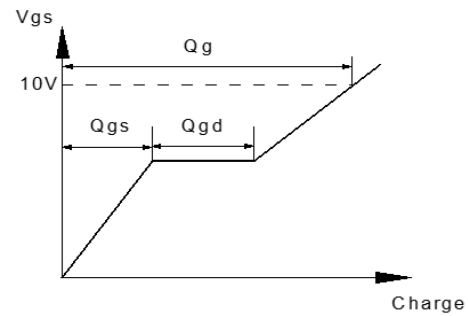
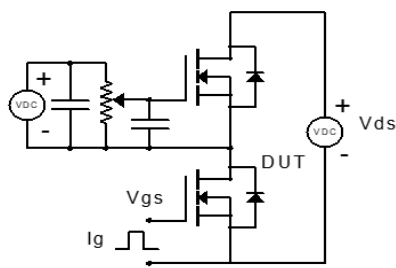


Figure 1: Gate Charge Test Circuit & Waveform

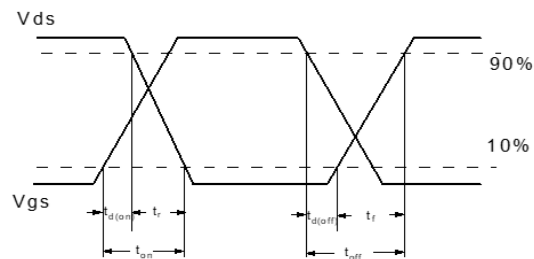
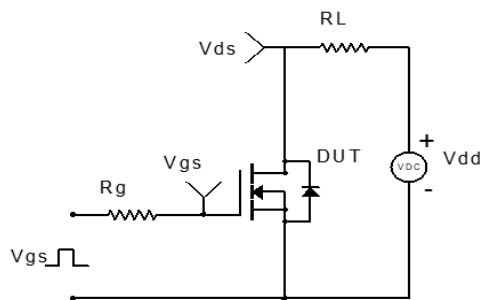


Figure 2: Resistive Switching Test Circuit & Waveform

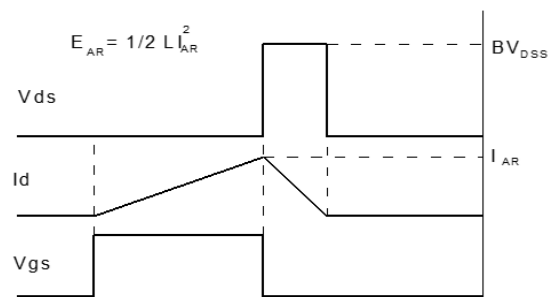
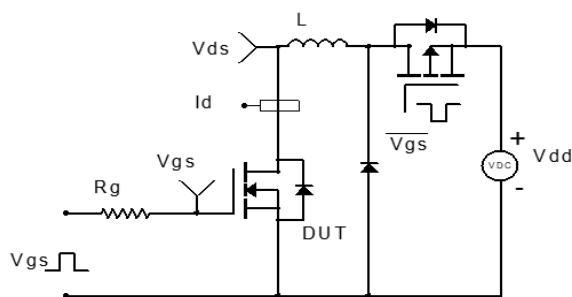


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

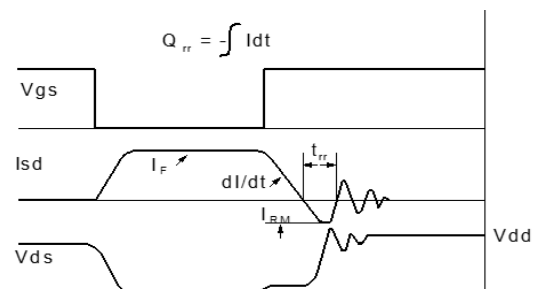
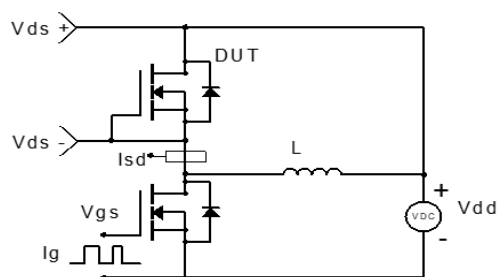
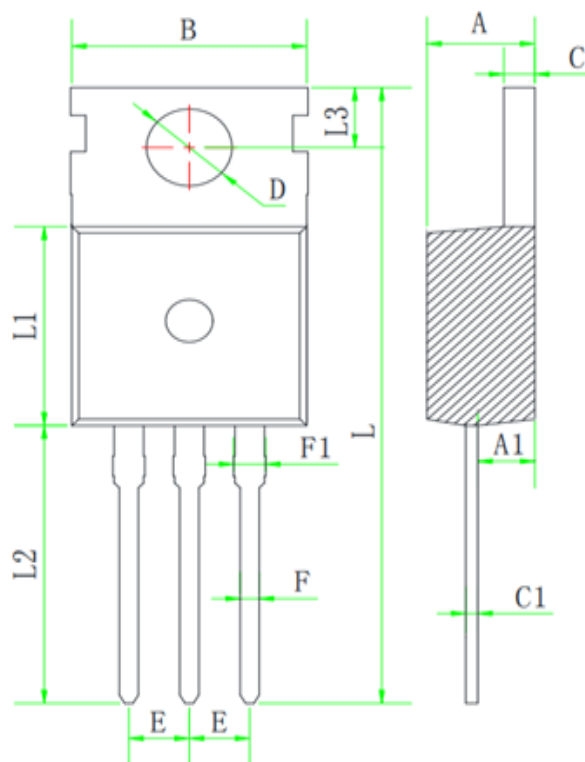


Figure 4: Diode Recovery Test Circuit & Waveform



Symbol	Min	Typ	Max
A	4.43	4.53	4.63
A1	2.30	2.40	2.50
B	9.90	10.0	10.10
C	1.25	1.30	1.40
C1	0.45	0.50	0.60
D	3.50	3.60	3.70
E	2.44	2.54	2.64
F	0.70	0.80	0.95
F1	1.20	1.35	1.50
L	26.80	28.80	30.80
L1	9.20	9.30	9.40
L2	12.90	13.10	13.30
L3	2.70	2.80	2.90