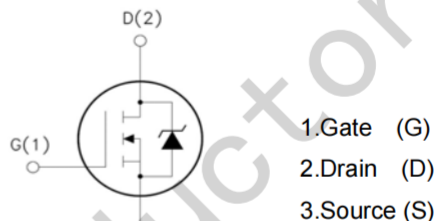
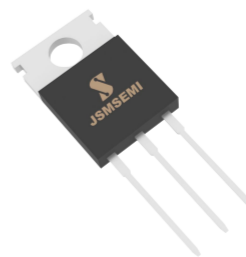


Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 72nC (Typ.).
- ☐ BVDSS=60V, I_D=85A
- ☐ R_{DS(on)} : 8.5mΩ (Max) @V_G=10V
- ☐ 100% Avalanche Tested



Absolute Maximum Ratings* (T_c=25°C Unless otherwise noted)

Symbol	PARAMETER		Value	Unit
V _{DSS}	Drain-Source Voltage		60	V
I _D	Drain Current	T _C =25°C	85	A
		T _C =100°C	65	
V _{GS(TH)}	Gate Threshold Voltage		±25	V
E _{AS}	Single Pulse Avalanche Energy (note1)		100	mJ
I _{AR}	Avalanche Current (note2)		85	A
P _D	Power Dissipation (T _c =25°C)		200	W
T _j	Junction Temperature(MAX)		150	°C
T _{stg}	Storage Temperature		-55~+150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds		300	°C

Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
R _{θJC}	Thermal Resistance, Junction to Case	-	0.63	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	-	62.5	°C/W

Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current($T_c=25^{\circ}C$)	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Zero Gate Voltage Drain Current($T_c=125^{\circ}C$)	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$	-	-	10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=40A$	-	7.5	8.5	m Ω
Dynamic Characteristics						
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=40A$	-	105	-	S
Input Capacitance	C_{iss}	$V_{DS}=35V, V_{GS}=0V,$ $F=1.0MHz$	-	3091	-	PF
Output Capacitance	C_{oss}		-	292	-	PF
Reverse Transfer Capacitance	C_{rss}		-	219	-	PF
Total Gate Charge	Q_g	$V_{DS}=32V, I_D=40A$ $, V_{GS}=10V$	-	72	-	nC
Gate-Source Charge	Q_{gs}		-	17	-	nC
Gate-Drain Charge	Q_{gd}		-	26	-	nC
Switching times						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=32V, I_D=40A, R_L=15$ $\Omega, V_{GS}=10V, R_G=2.7\Omega$	-	13	-	nS
Turn-on Rise Time	t_r		-	75	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	46	-	nS
Turn-Off Fall Time	t_f		-	73	-	nS
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I_{SD}		-	-	85	A
Pulsed Source-drain current(Body Diode)	I_{SDM}		-	-	300	A
Forward on voltage ^(Note 1)	V_{SD}	$T_j=25^{\circ}C, I_{SD}=85A, V_{GS}=0V$	-	-	1.5	V
Reverse Recovery Time ^(Note 1)	t_{rr}	$T_j=25^{\circ}C, I_F=85A, di/dt=100A/\mu s$	-	36	-	nS
Reverse Recovery Charge ^(Note 1)	Q_{rr}		-	43	-	nC
Forward Turn-on Time	t_{on}	Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D)				

Notes 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1.5\%$, $R_G=25\Omega$, Starting $T_j=25^{\circ}\text{C}$

Typical Electrical and Thermal Characteristics (curves)

Fig 1: Output Characteristics

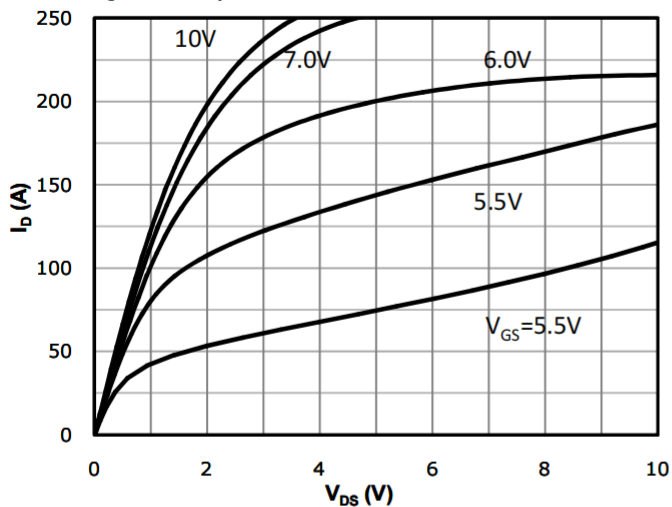


Fig 2: Transfer Characteristics

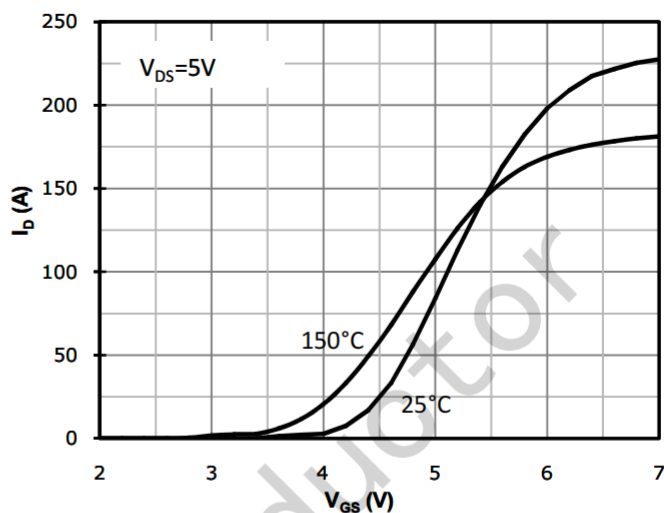


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

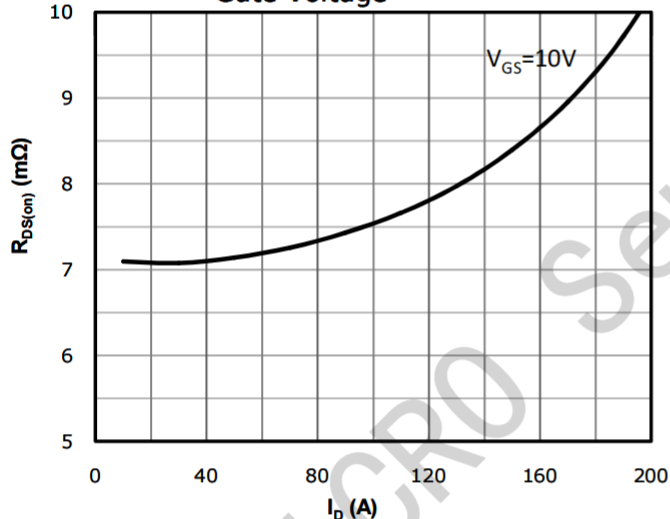


Fig 4: $R_{DS(on)}$ vs Gate Voltage

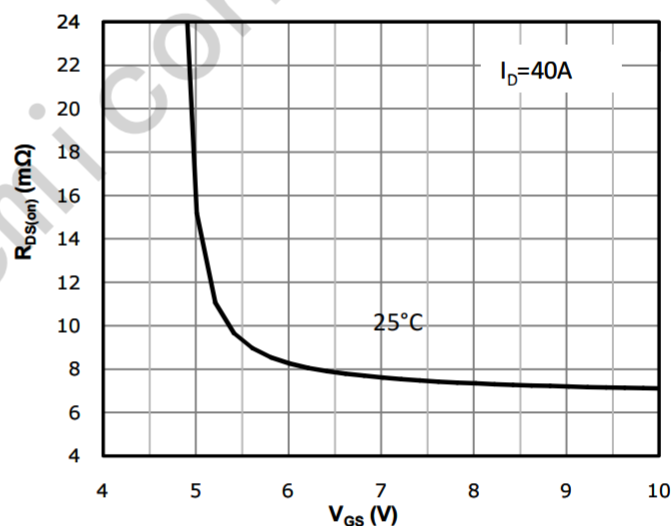


Fig 5: $R_{DS(on)}$ vs. Temperature

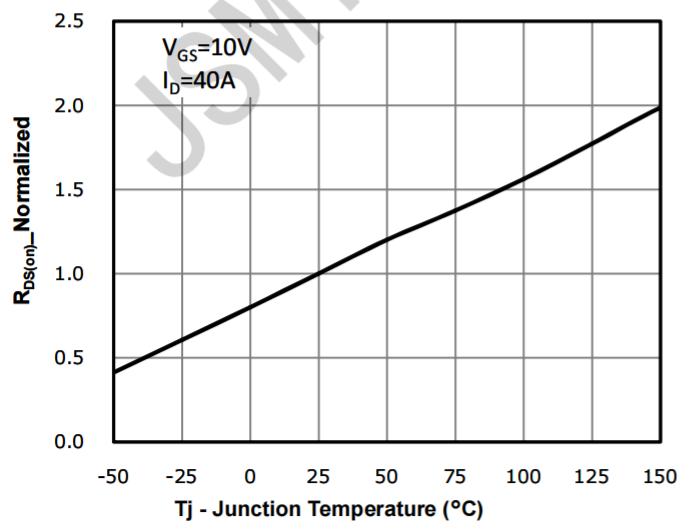


Fig 6: Capacitance Characteristics

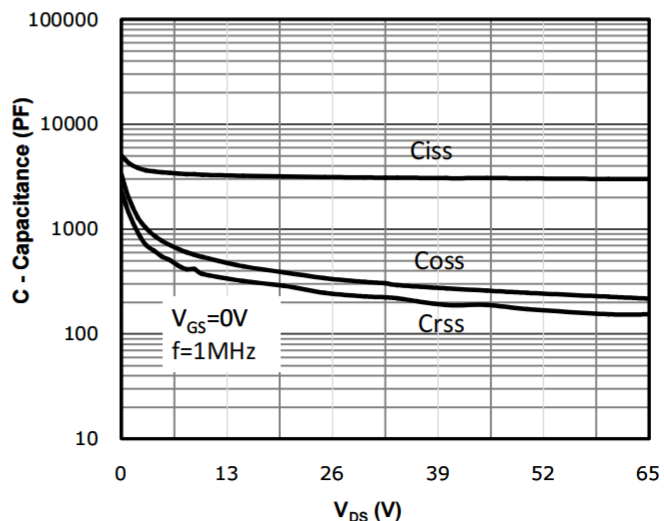


Fig 7: Gate Charge Characteristics

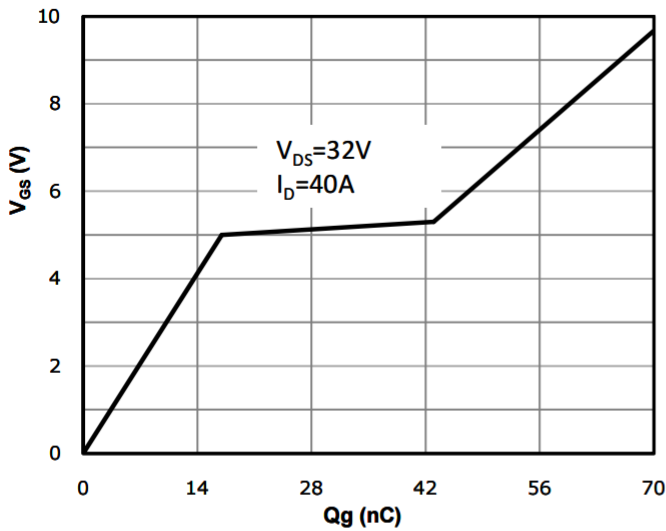


Fig 8: Body-diode Forward Characteristics

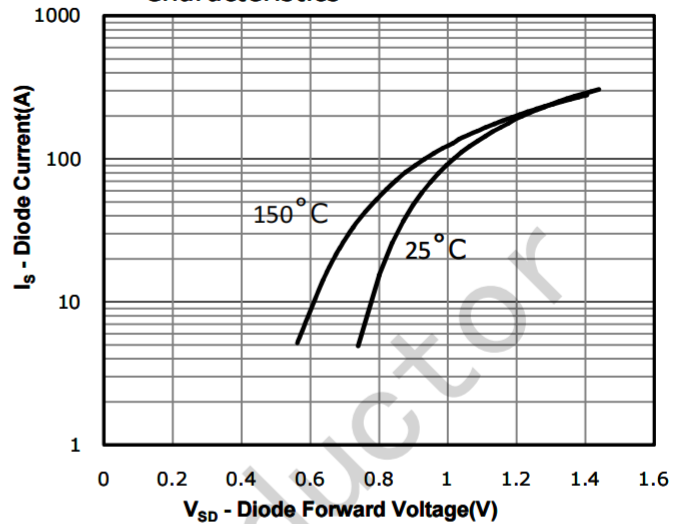


Fig 9: Power Dissipation

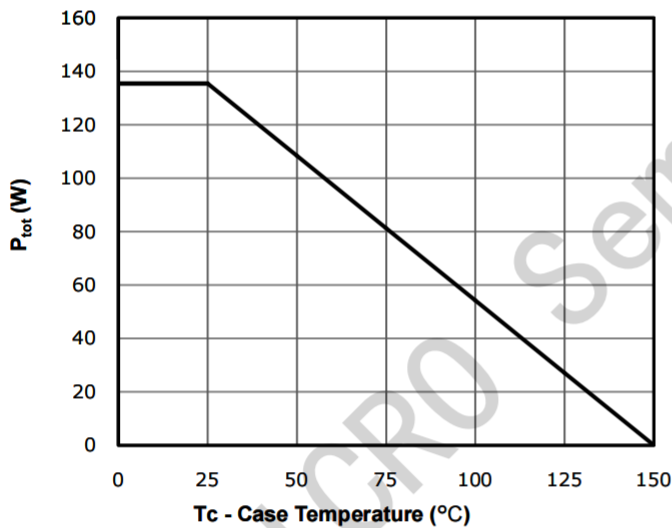


Fig 10: Drain Current Derating

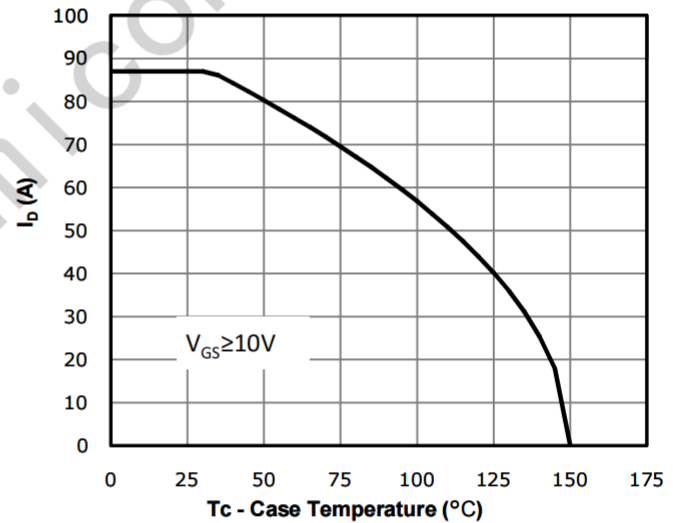


Fig 11: Safe Operating Area

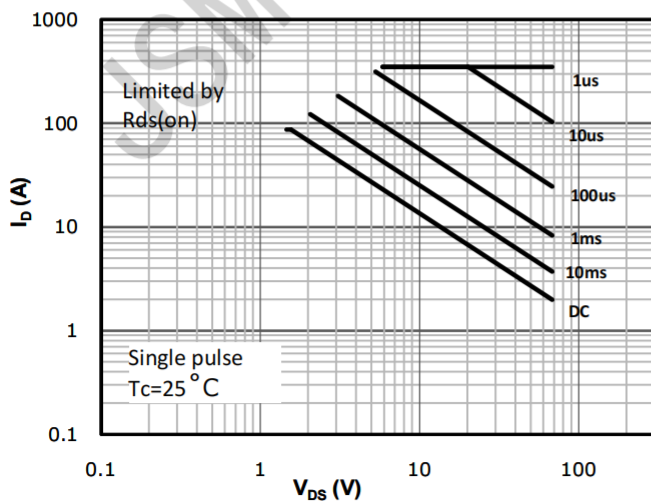
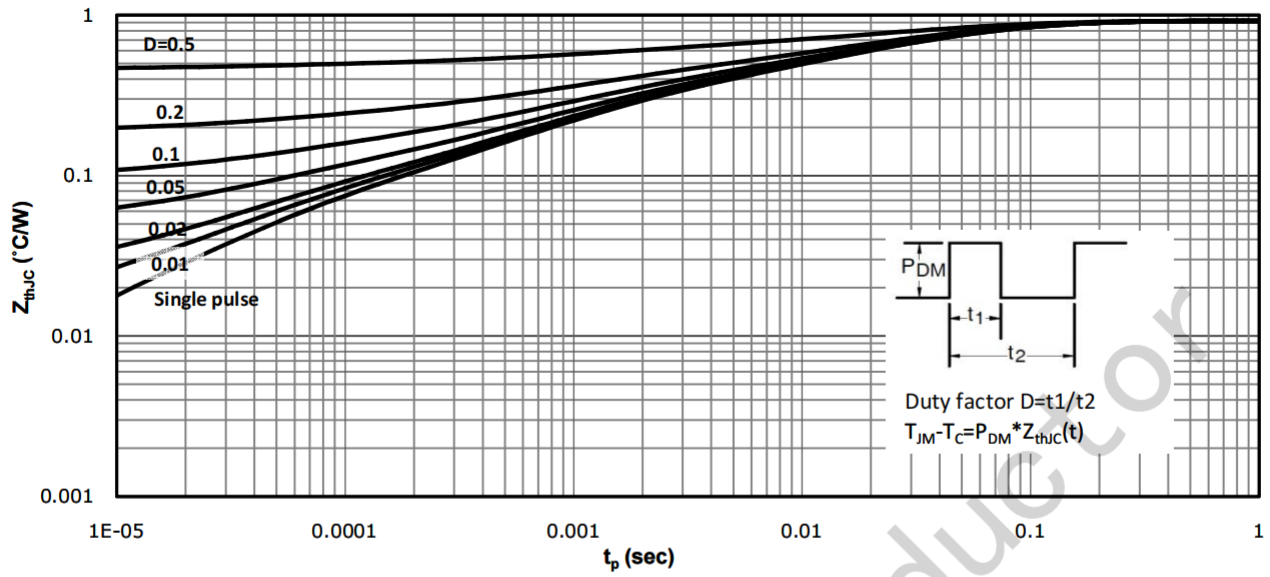
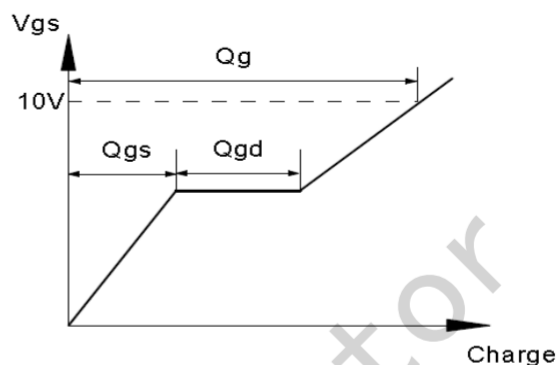
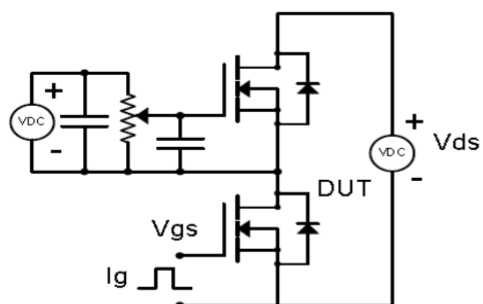


Fig 12: Max. Transient Thermal Impedance

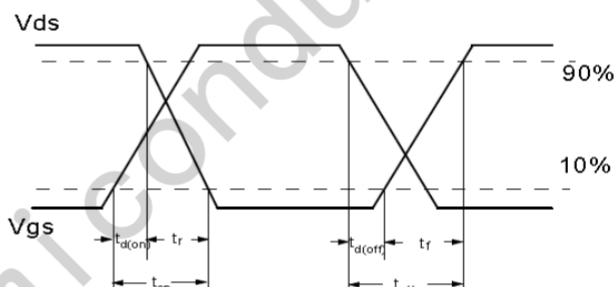
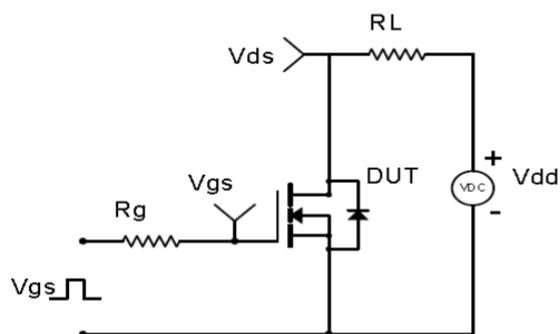


Test Circuit & Waveform

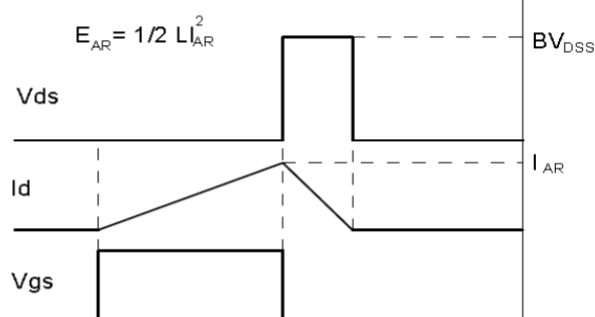
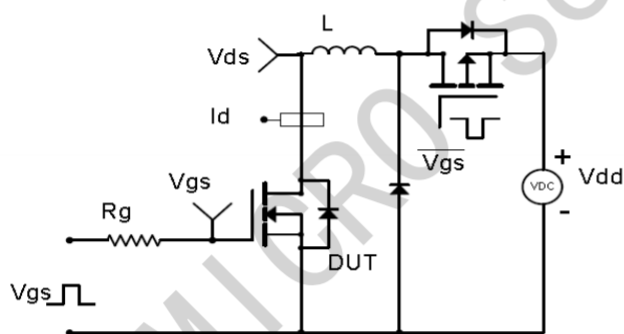
Gate Charge Test Circuit & Waveform



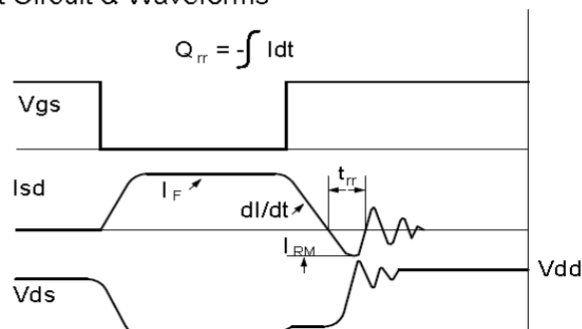
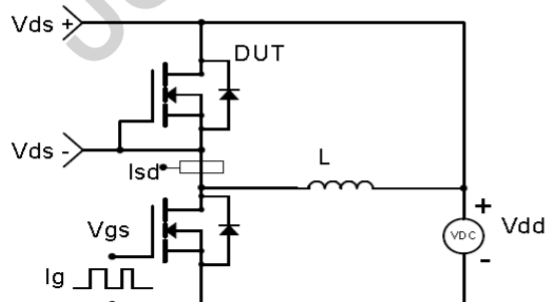
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

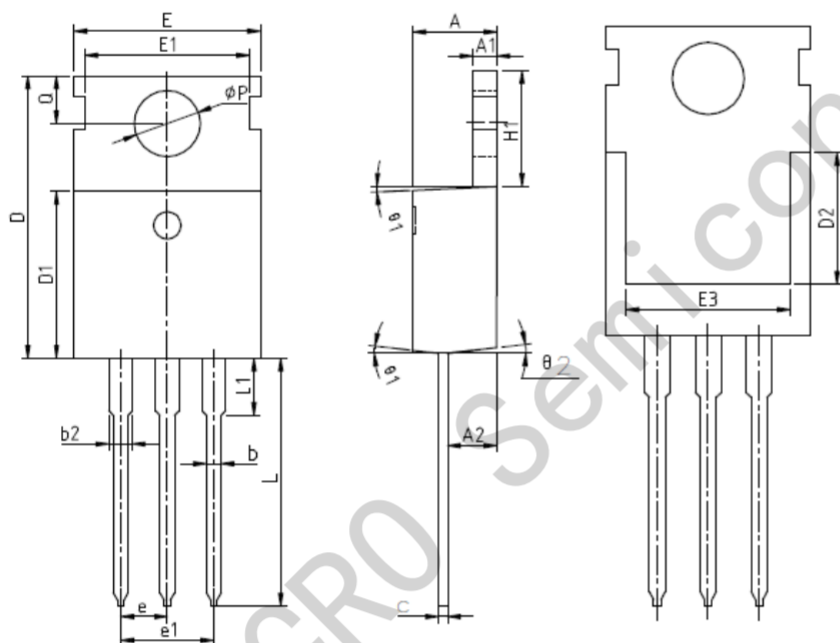


Diode Recovery Test Circuit & Waveforms



Package Information

TO-220



SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.65	10.00	10.35
E3	7.00	8.00	8.40
e	2.54 BSC		
e1	5.08 BSC		
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
ΦP	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ 1	4°	7°	10°
θ 2	0°	3°	6°