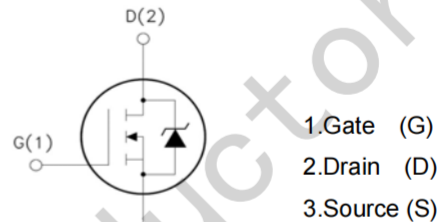
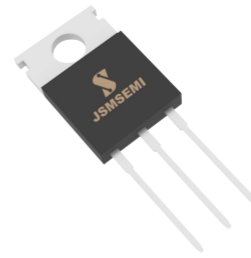


**Features:**

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 72nC (Typ.).
- BVDSS=60V,I<sub>D</sub>=85A
- R<sub>DS(on)</sub> : 8.5mΩ (Max) @V<sub>G</sub>=10V
- 100% Avalanche Tested


**Absolute Maximum Ratings\*** (T<sub>c</sub>=25°C Unless otherwise noted)

Symbol	PARAMETER	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	60	V
I <sub>D</sub>	Drain Current	T <sub>C</sub> =25°C	85
		T <sub>C</sub> =100°C	65
V <sub>GS(TH)</sub>	Gate Threshold Voltage	±25	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (note1)	100	mJ
I <sub>AR</sub>	Avalanche Current (note2)	85	A
P <sub>D</sub>	Power Dissipation (T <sub>c</sub> =25°C)	200	W
T <sub>j</sub>	Junction Temperature(MAX)	150	°C
T <sub>stg</sub>	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 <sub>θJC</sub>	Thermal Resistance,Junction to Case	-	0.63	°C/W
R <sub>θJA</sub>	Thermal Resistance,Junction to Ambient	-	62.5	°C/W

**Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>On/off states</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	60	-	-	V
Zero Gate Voltage Drain Current(T <sub>c</sub> =25°C)	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	-	-	1	μA
Zero Gate Voltage Drain Current(T <sub>c</sub> =125°C)	I <sub>DSS</sub>	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V	-	-	10	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	-	4	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =40A	-	7.5	8.5	mΩ
<b>Dynamic Characteristics</b>						
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =40A	-	105	-	S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =35V, V <sub>GS</sub> =0V, F=1.0MHz	-	3091	-	PF
Output Capacitance	C <sub>oss</sub>		-	292	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	219	-	PF
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =32V, I <sub>D</sub> =40A , V <sub>GS</sub> =10V	-	72	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	17	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	26	-	nC
<b>Switching times</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =32V, I <sub>D</sub> =40A, R <sub>L</sub> =15 Ω V <sub>GS</sub> =10V, R <sub>G</sub> =2.7Ω	-	13	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	75	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	46	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	73	-	nS
<b>Source- Drain Diode Characteristics</b>						
Source-drain current(Body Diode)	I <sub>SD</sub>		-	-	85	A
Pulsed Source-drain current(Body Diode)	I <sub>SDM</sub>		-	-	300	A
Forward on voltage <sup>(Note 1)</sup>	V <sub>SD</sub>	T <sub>j</sub> =25°C, I <sub>SD</sub> =85A, V <sub>GS</sub> =0V	-	-	1.5	V
Reverse Recovery Time <sup>(Note 1)</sup>	t <sub>rr</sub>	T <sub>j</sub> =25°C, I <sub>F</sub> =85A, di/dt=100A/μs	-	36	-	nS
Reverse Recovery Charge <sup>(Note 1)</sup>	Q <sub>rr</sub>		-	43	-	nC
Forward Turn-on Time	t <sub>on</sub>	Intrinsic turn-on time is negligible(turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, R<sub>G</sub>=25Ω, Starting T<sub>j</sub>=25°C

Typical Electrical and Thermal Characteristics (curves)

Fig 1: Output Characteristics

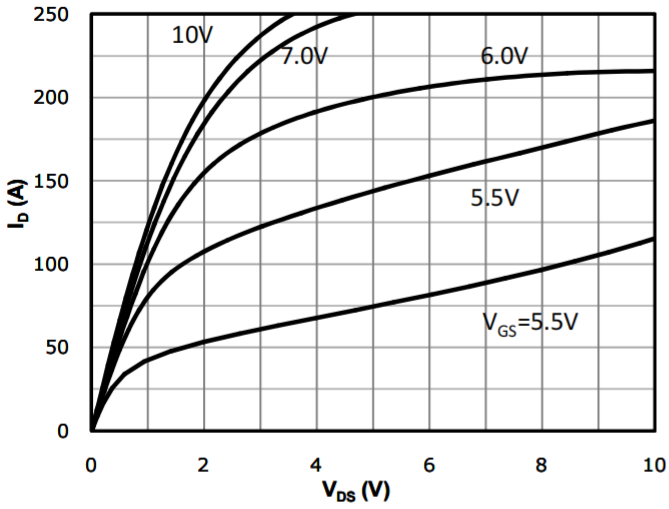


Fig 2: Transfer Characteristics

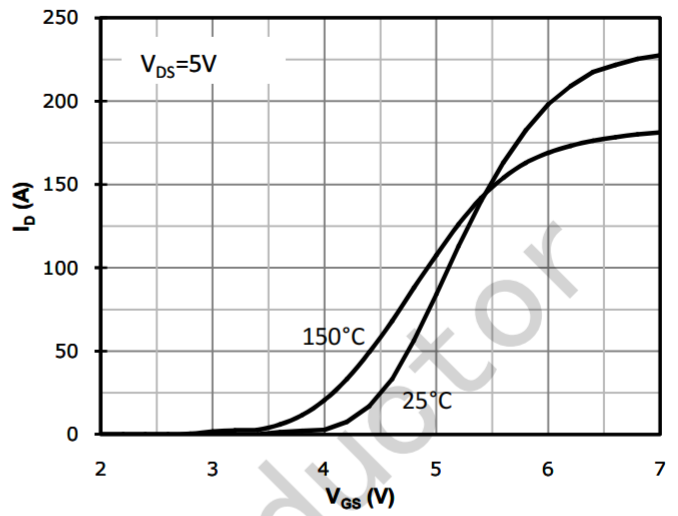


Fig 3: Rds(on) vs Drain Current and Gate Voltage

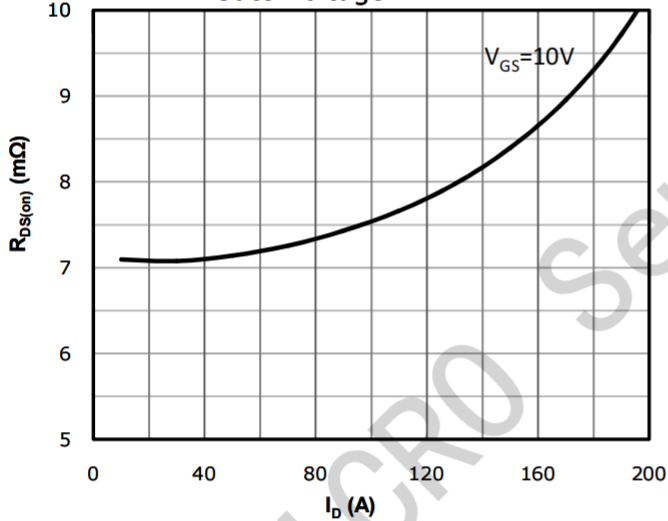


Fig 4: Rds(on) vs Gate Voltage

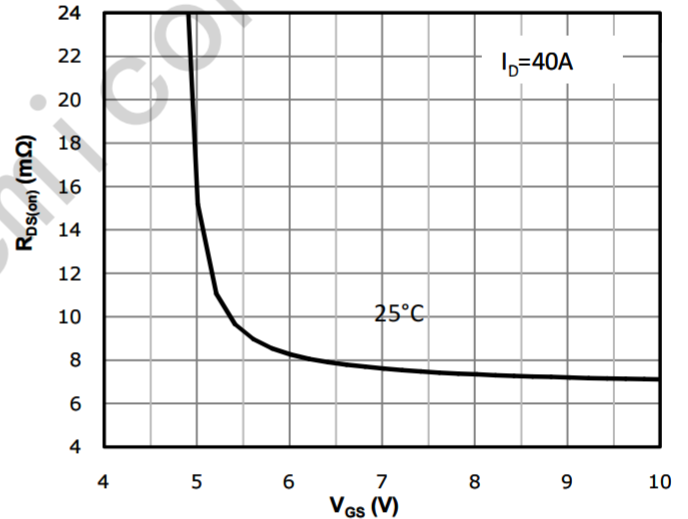


Fig 5: Rds(on) vs. Temperature

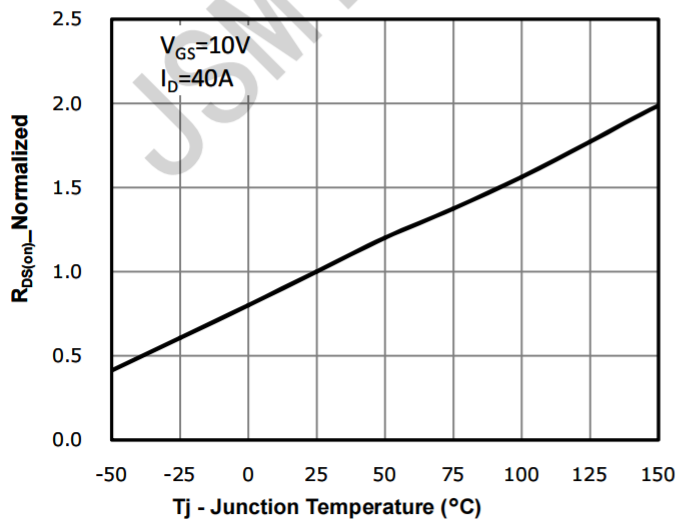


Fig 6: Capacitance Characteristics

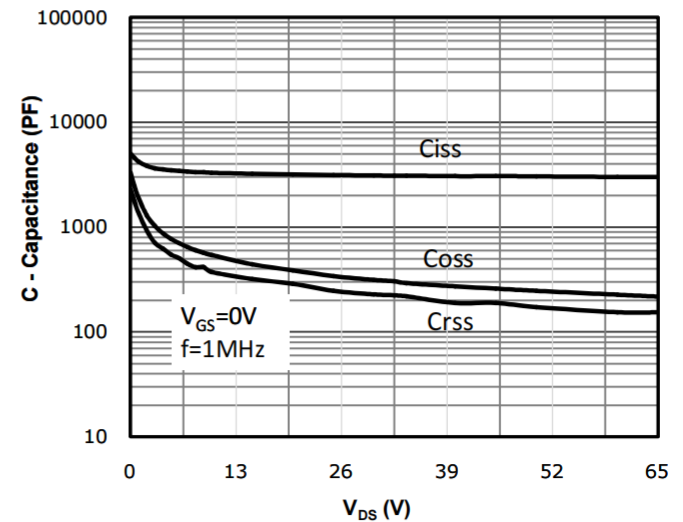


Fig 7: Gate Charge Characteristics

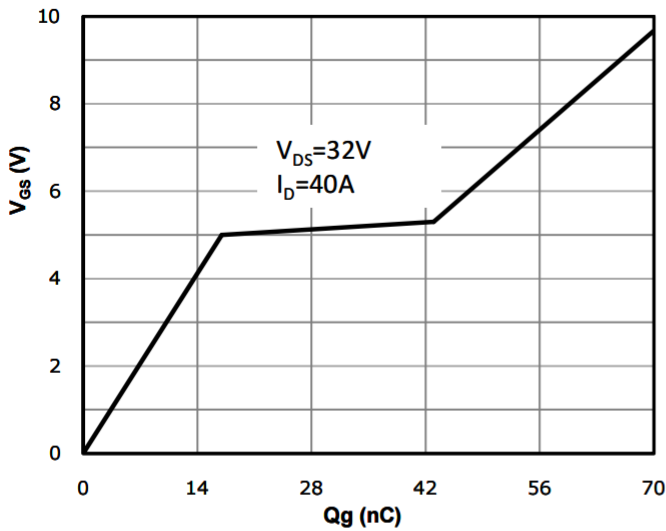


Fig 8: Body-diode Forward Characteristics

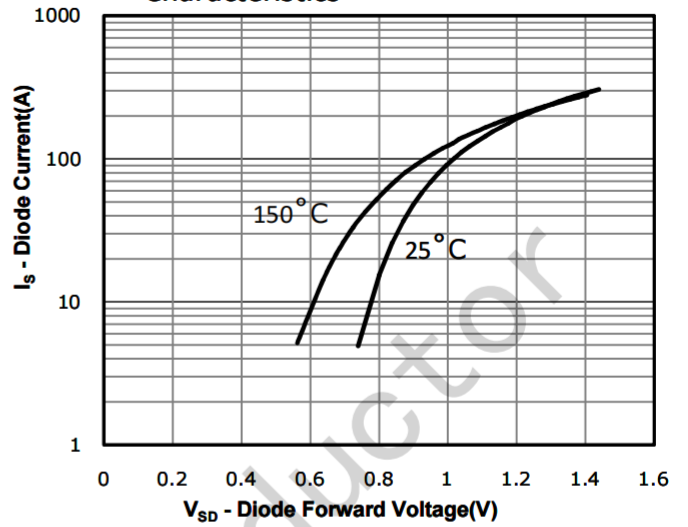


Fig 9: Power Dissipation

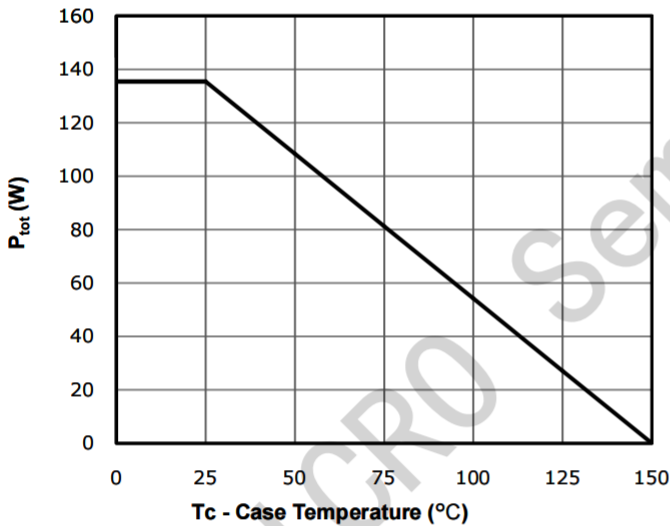


Fig 10: Drain Current Derating

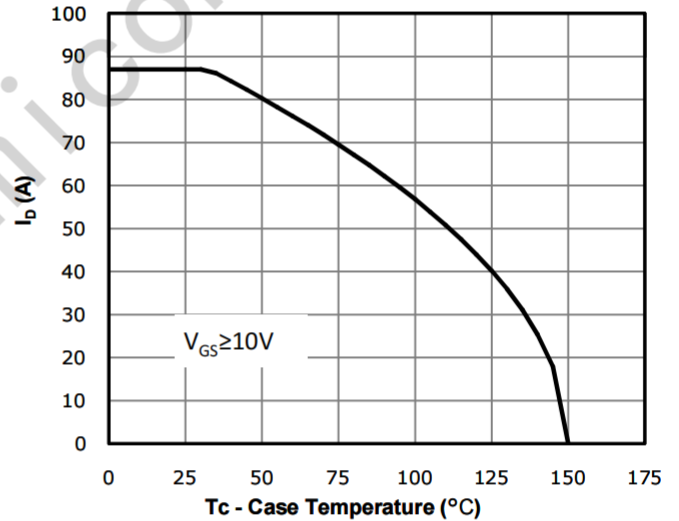


Fig 11: Safe Operating Area

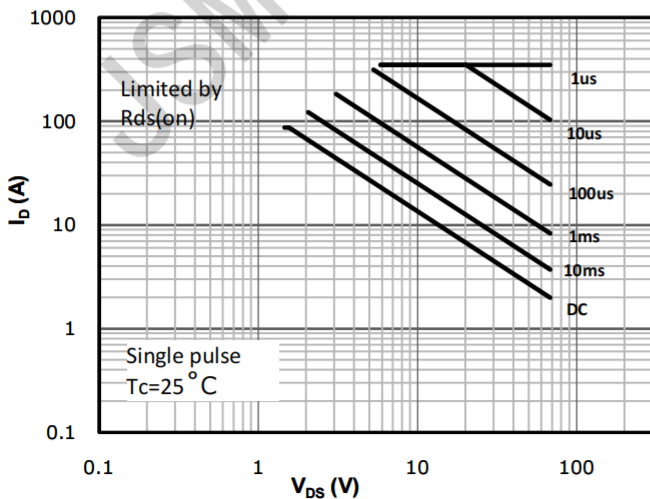
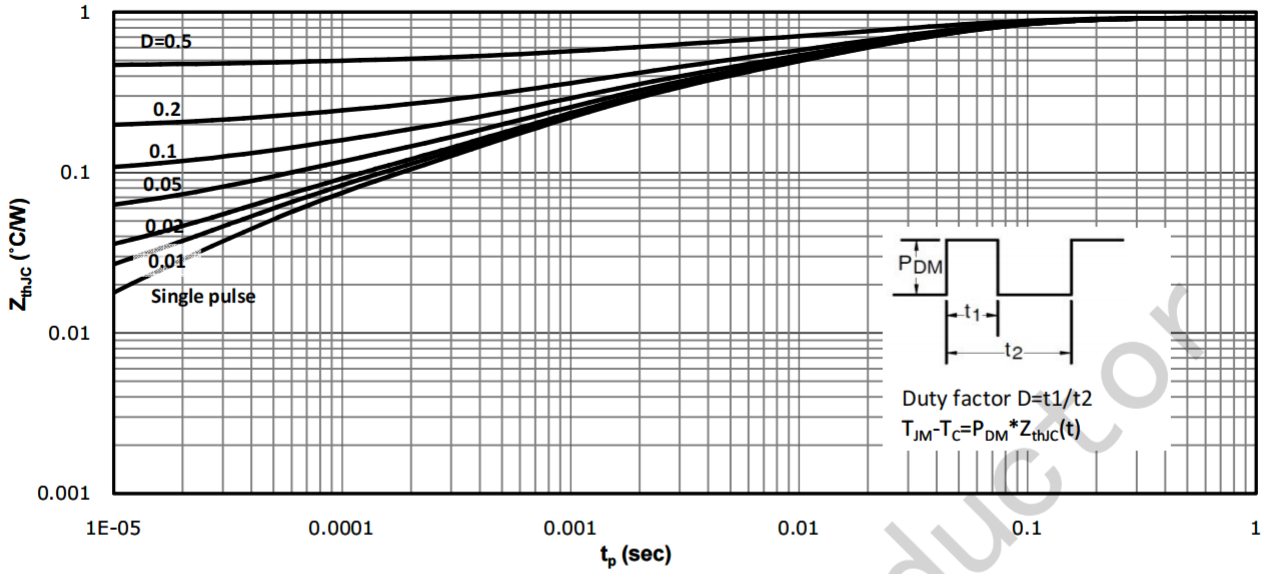
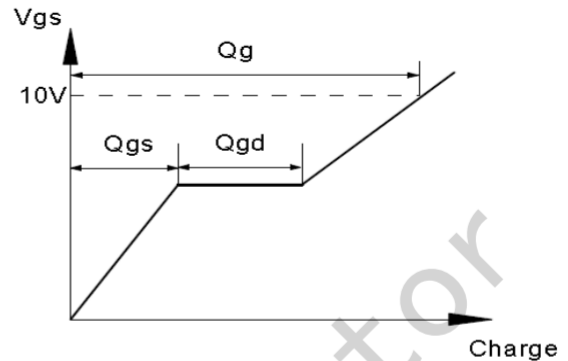
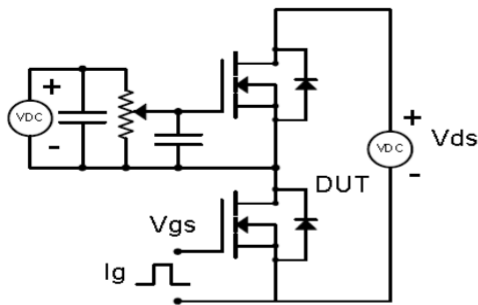


Fig 12: Max. Transient Thermal Impedance

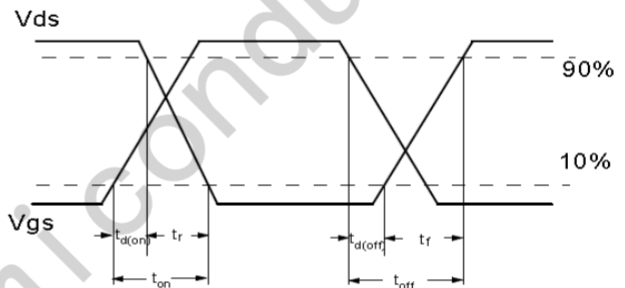
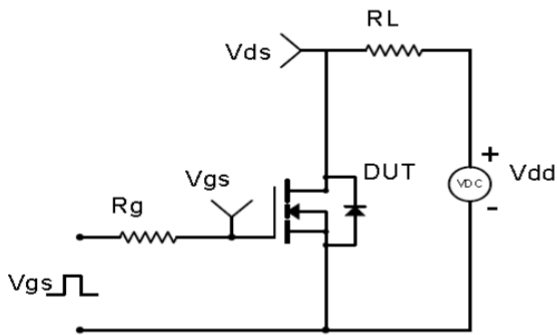


**Test Circuit & Waveform**

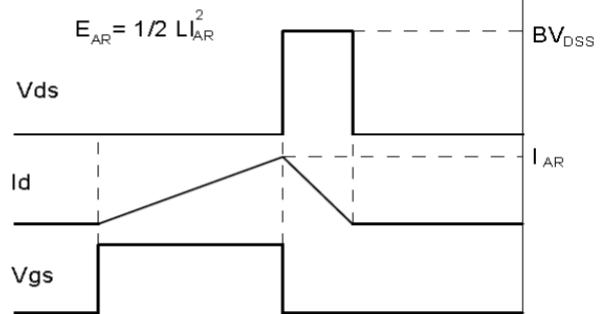
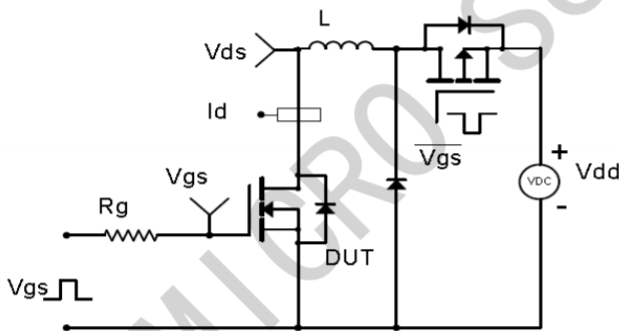
Gate Charge Test Circuit & Waveform



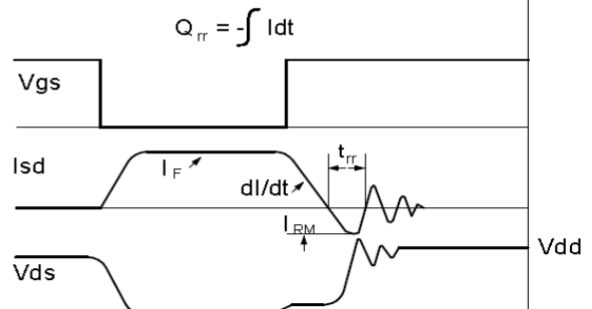
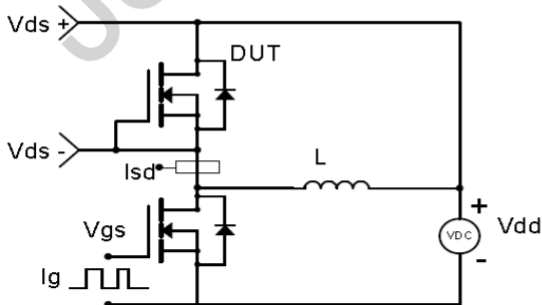
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

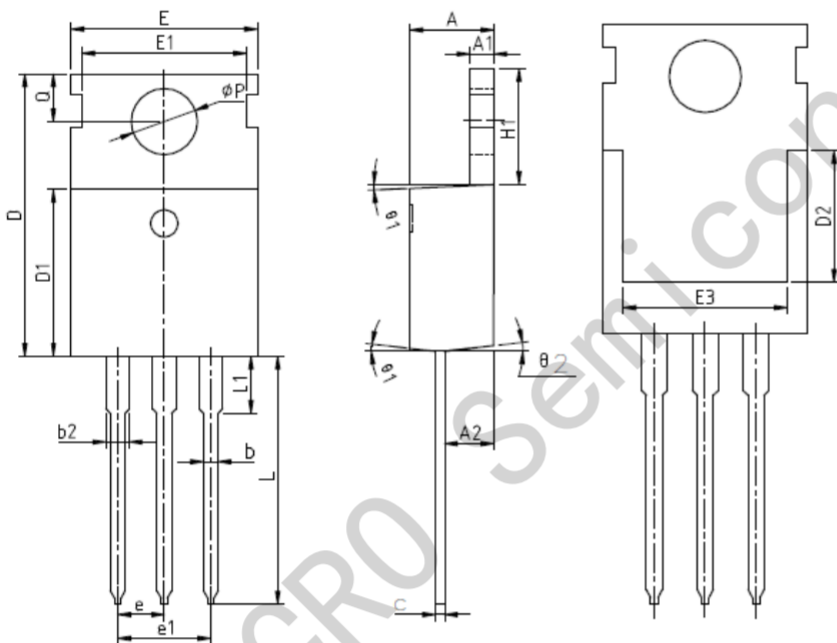


Diode Recovery Test Circuit & Waveforms



## 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
phi P	3.45	3.60	3.75
Q	2.60	2.80	3.00
theta 1	4°	7°	10°
theta 2	0°	3°	6°

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