

Product Summary

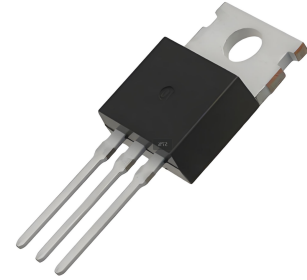
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	$R_{DS(on),typ}$ (mΩ)	I_D (A)
100	4.9 @ $V_{GS} = 10V$	4.2 @ $V_{GS} = 10V$	135 ⁽¹⁾

Features

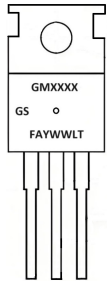
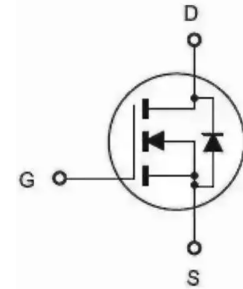
- Low $R_{DS(on)}$ SGT technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

- DC/DC conversion
- Power switch
- Motor drives



Equivalent circuit



TO-220

NOTE:
 LOGO - GS
 GMXXXX- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

Absolute maximum rating@25°C

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	±20	
Continuous drain current	I_D	135	A
		90	
		18	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	480	
Avalanche energy, single pulse ⁽³⁾	E_{AS}	150	mJ
Power dissipation	P_D	156	W
		3.1	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	°C

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	0.8	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	$R_{\theta JA}$	40	

Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0, I _D = 250 μA	100			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.2	3	3.8	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 50 A		4.2	4.9	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 50 A		90		S
Gate resistance	R _g	f = 1 MHz		1.5		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 50 V, I _D = 50 A, V _{GS} = 10 V		69		nC
Gate-source charge	Q _{gs}			22		
Gate-drain charge	Q _{gd}			17		
Turn-on delay time	t _{d(on)}	V _{DS} = 50 V, I _D = 50 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		53		ns
Rise time	t _r			88		
Turn-off delay time	t _{d(off)}			85		
Fall time	t _f			22		
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		4646		pF
Output capacitance	C _{oss}			580		
Reverse transfer capacitance	C _{rss}			30		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 50 A		0.9	1.2	V
Reverse recovery time	t _{rr}	V _{DS} = 50 V, I _F = 50 A, di/dt = 100 A/μs		72		ns
Reverse recovery charge	Q _{rr}			138		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) V_{DS} = 50 V, V_{GS} = 10 V, L = 0.3 mH.
- (4) R_{θJA} is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.
- (5) Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

Fig.1 Typ. transfer characteristics

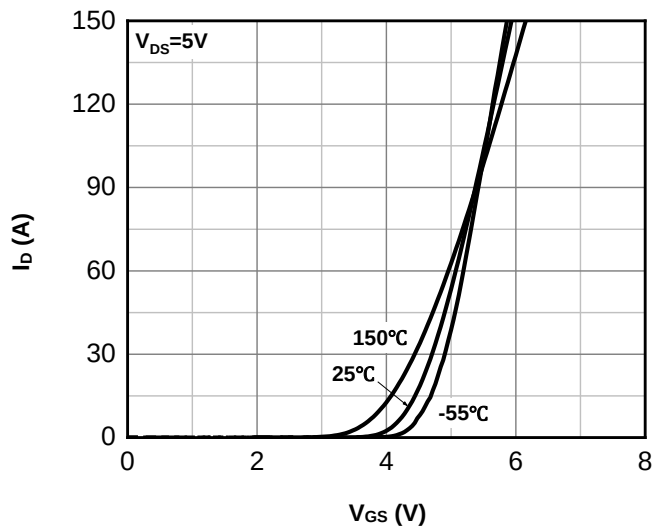


Fig.2 Typ. output characteristics

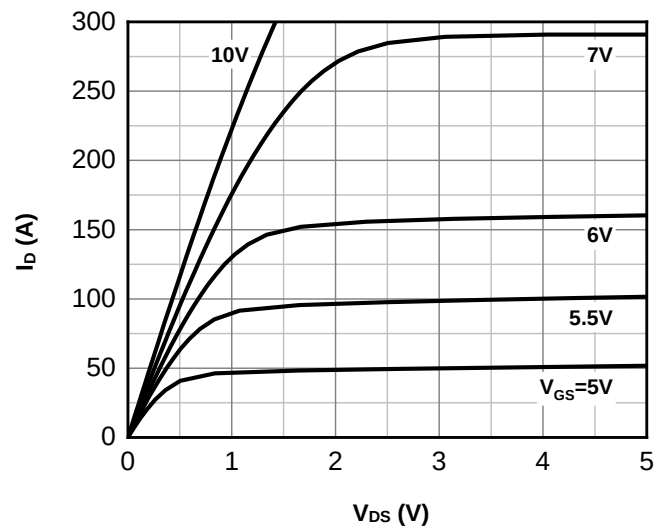


Fig.3 Normalized on-resistance vs drain current

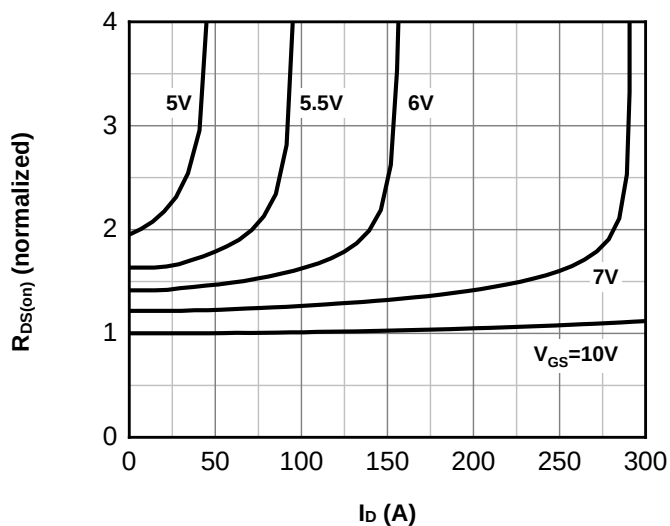


Fig.4 Typ. on-resistance vs gate-source voltage

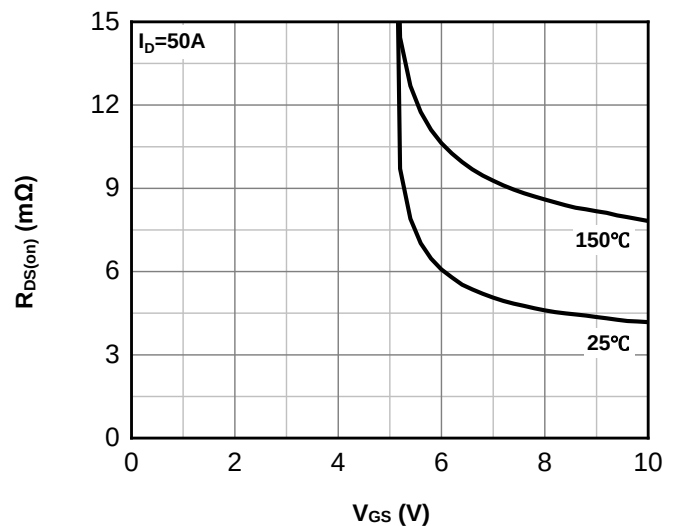


Fig.5 Normalized on-resistance vs junction temperature

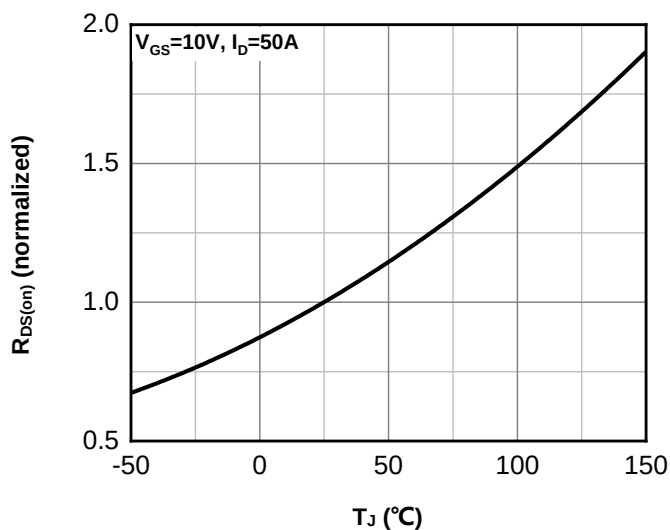
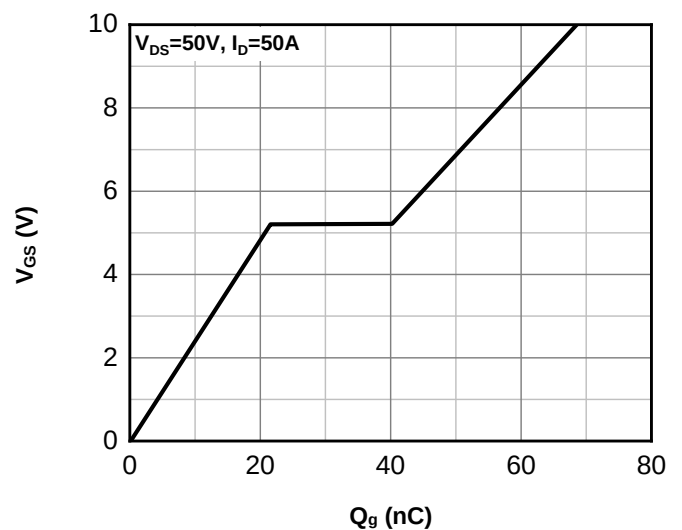
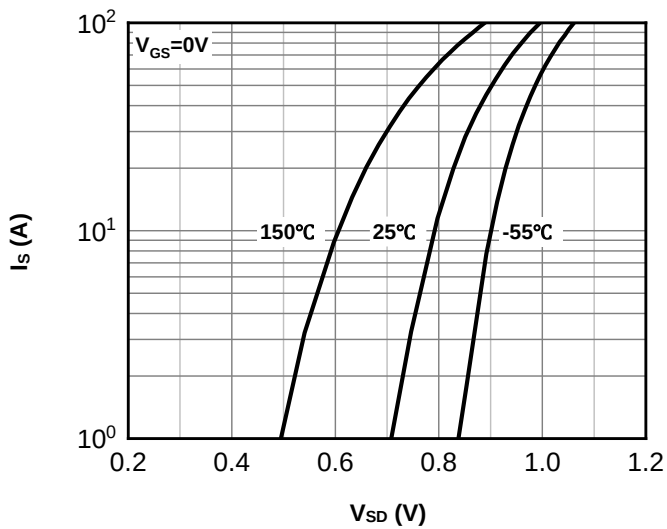
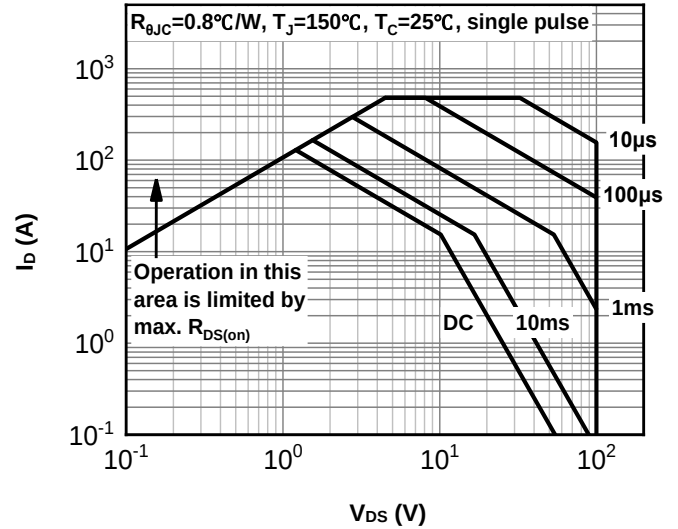
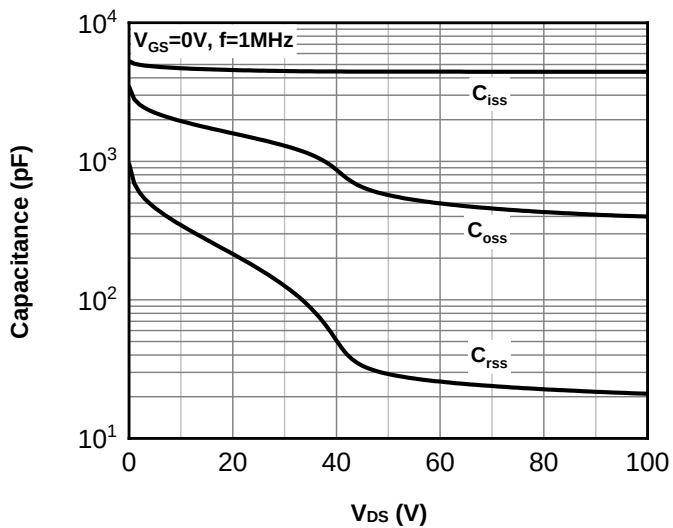
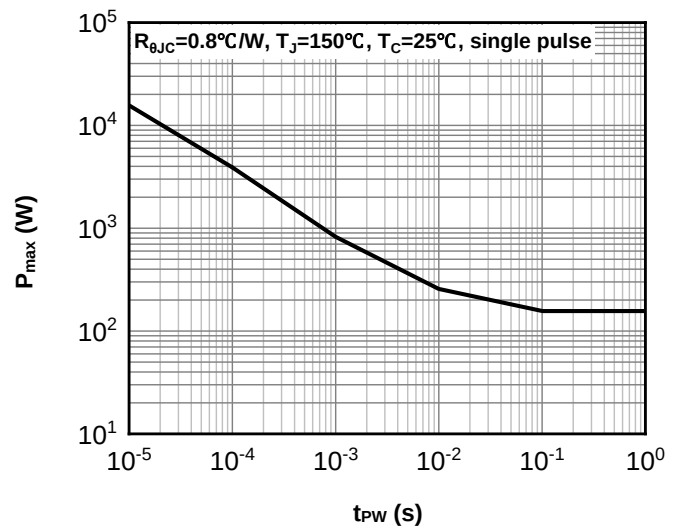
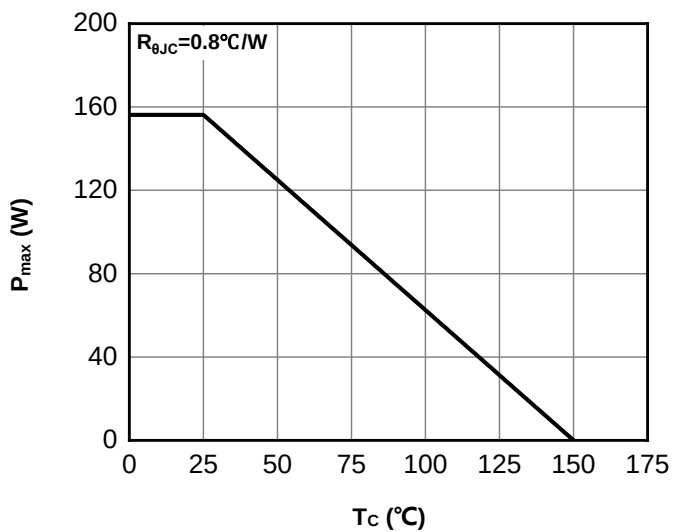
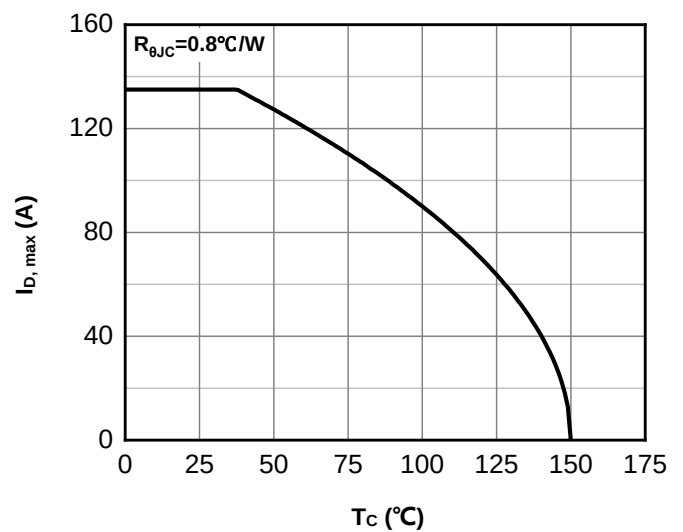


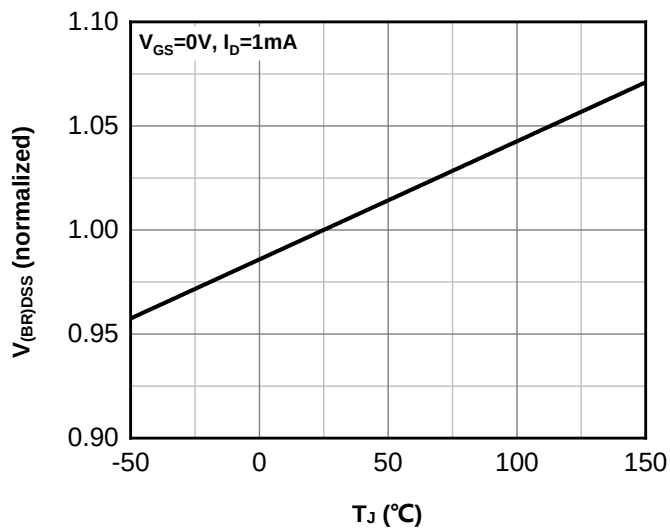
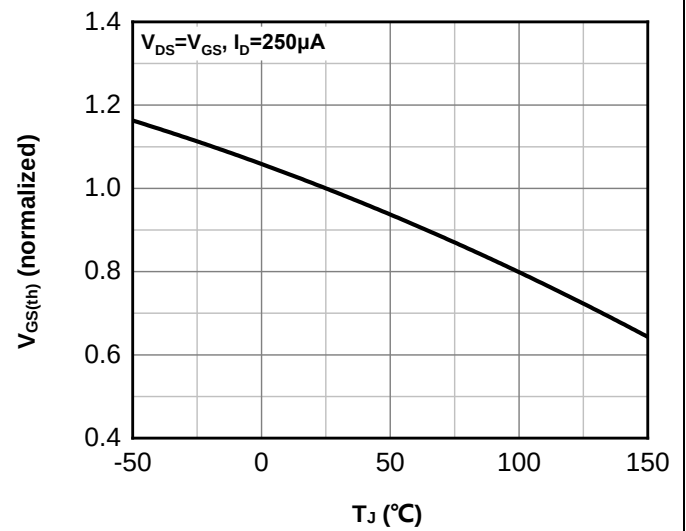
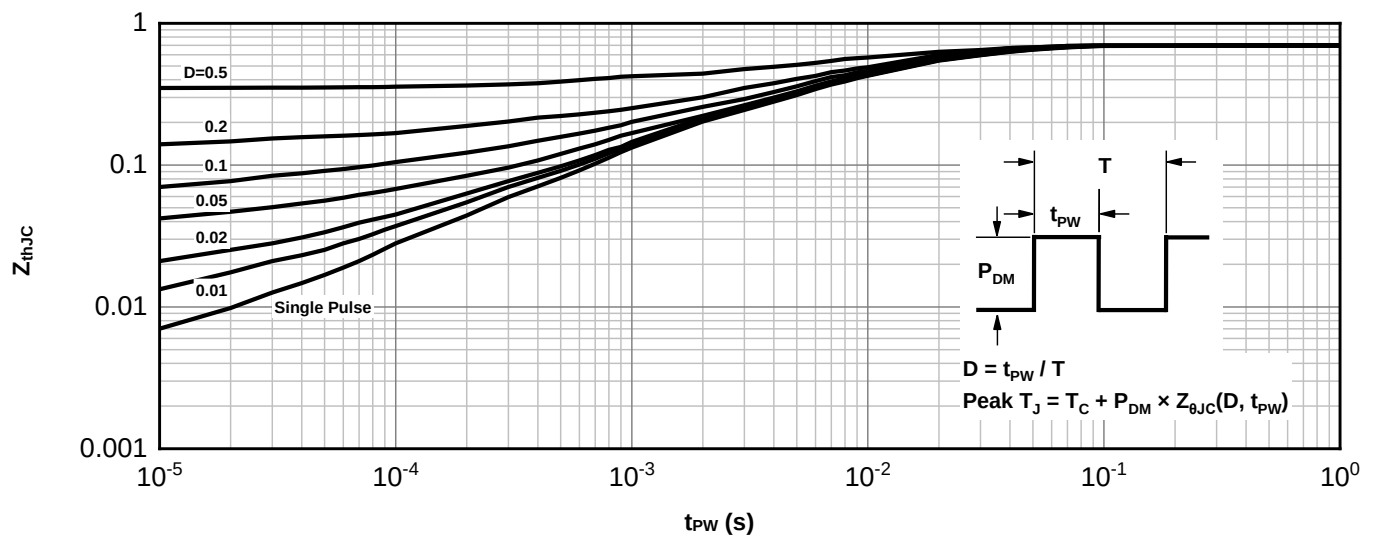
Fig.6 Typ. gate charge



Typical Performance Characteristics

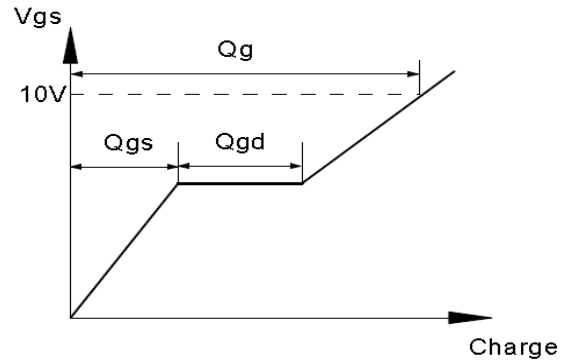
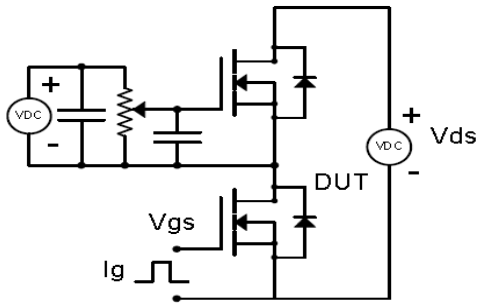
Fig.7 Typ. forward characteristics of body diode

Fig.8 Safe operating area

Fig.9 Typ. Capacitance

Fig.10 Single pulse maximum power dissipation

Fig.11 Max. power dissipation vs case temperature

Fig.12 Max. continuous drain current vs case temperature


Typical Performance Characteristics

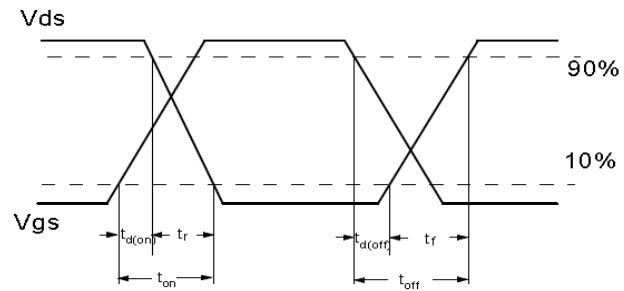
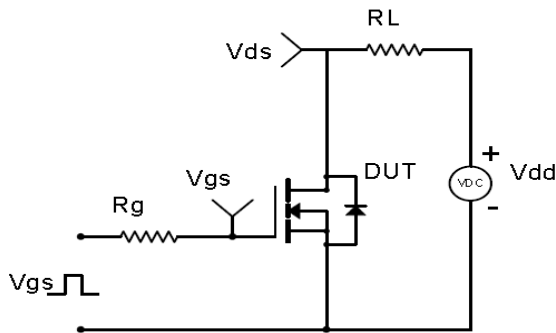
Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

Fig.15 Transient thermal impedance from junction to case


Test Circuit & Waveform

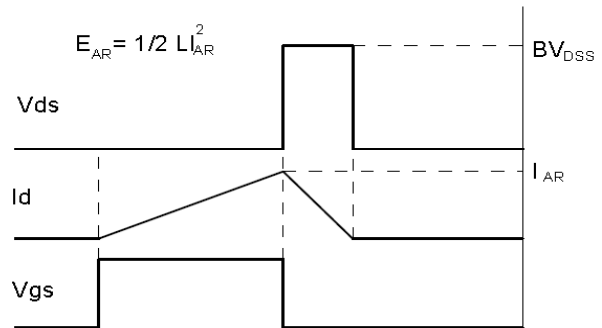
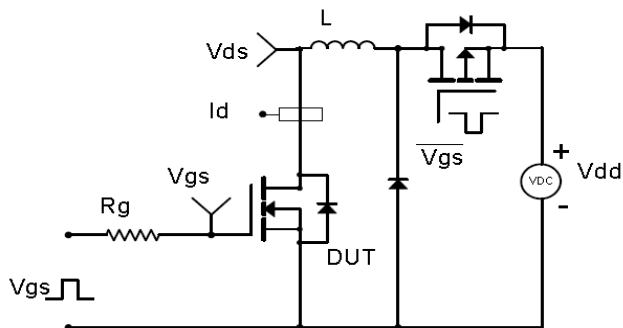
Gate Charge Test Circuit & Waveform



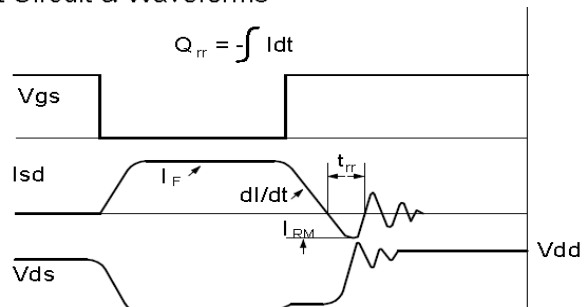
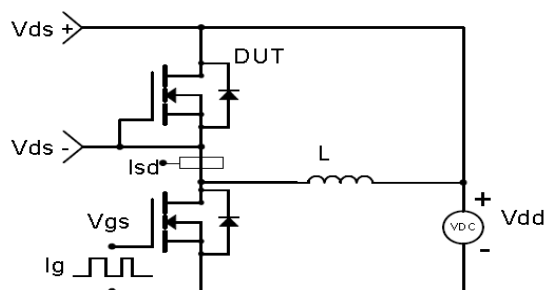
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

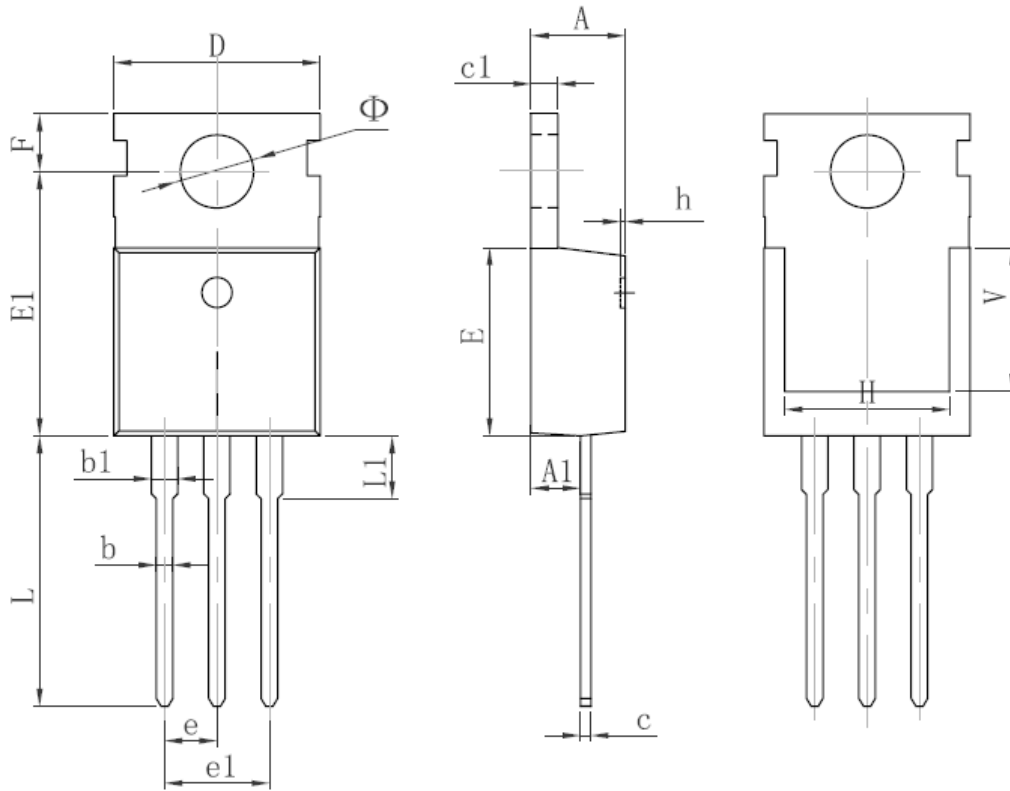


Diode Recovery Test Circuit & Waveforms





Outline Drawing TO-220



Symbol	Dimensions In Millimeters		
	Min.	NOM.	Max.
A	4.40	-	4.60
A1	2.25	-	2.55
b	0.71	-	0.91
b1	1.17	-	1.37
c	0.33	-	0.65
c1	1.20	-	1.40
D	9.91	-	10.25
E	8.95	-	9.75
E1	12.65	-	13.05
e	2.54 TYP-		
e1	4.98	-	5.18
F	2.65	-	2.95
H	7.90	-	8.10
h	0.00	-	0.30
L	12.90	-	13.40
L1	2.85	-	3.25
V	6.90 REF		
φ	3.40	-	3.80

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