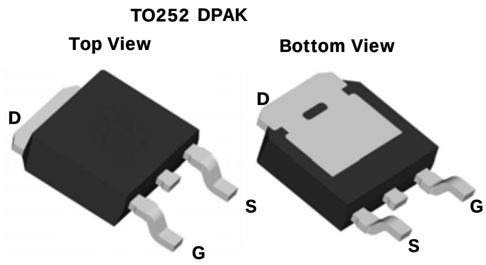
SEMICONDUCTOR
TECHNICAL DATA

FTK30N06D

60V N-Channel MOSFET

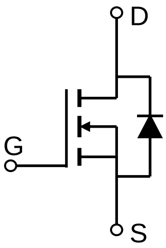
Features

- 60V, 20A
  $R_{DS(ON)}$ =23mΩ @ V_{GS} = 10V (Typ.)
  $R_{DS(ON)}$ =32mΩ @ V_{GS} = 4.5V(Typ.)
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free



Applications

- Load Switch
- PWM Application
- Power Management



Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{DS}	Drain-to-Source Voltage		60	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25°C	20	A
		T_C = 100°C	12	
I_{DM}	Pulsed Drain Current (1)		Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy (2)		24	mJ
P_D	Power Dissipation	T_C = 25°C	37	W
		T_C = 100°C	15	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)	42	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.4	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.1	1.6	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance$^{(4)}$	V_{GS} = 10V, I_D = 20A	-	23	33	mΩ
		V_{GS} = 4.5V, I_D = 10A	-	32	45	mΩ
Dynamic Characteristics						
R_g	Gate Resistance	f = 1MHz	-	1.4	-	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 30V, f = 1MHz	848	1187	1602	pF
C_{oss}	Output Capacitance		40	56	76	pF
C_{rss}	Reverse Transfer Capacitance		34	47	63	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 30V, I_D = 10A	17	24	33	nC
Q_{gs}	Gate Source Charge		-	4.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	4.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 30V I_D= 10A, R_{GEN} = 3Ω	-	6.7	-	ns
t_r	Turn-On Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	24	-	ns
t_f	Turn-Off Fall Time		-	2.7	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	20	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	79	A
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 10A, di/dt = 100A/us	13	19	25	ns
Qrr	Body Diode Reverse Recovery Charge		-	19	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=30V, V_{GS}=10V, R_G=25ohm, L=0.5mH, I_{AS}=9.8A, V_{DD}=0V during time in avalanche.
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
4. Pulse Test: Pulse Width≤ 300μs, Duty Cycle≤ 0.5%.

Typical Performance Characteristics

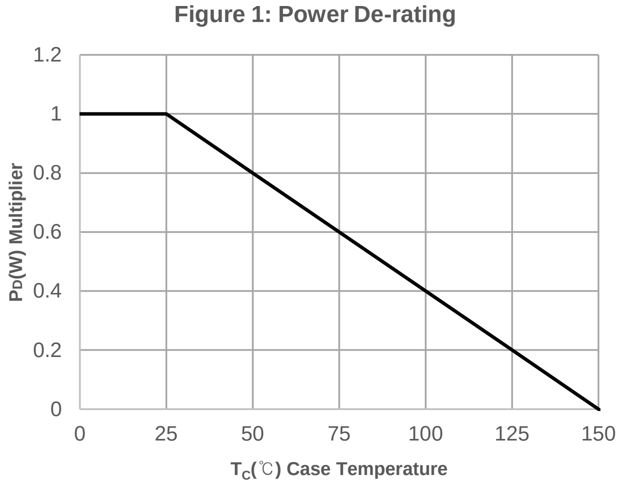


Figure 1: Power De-rating

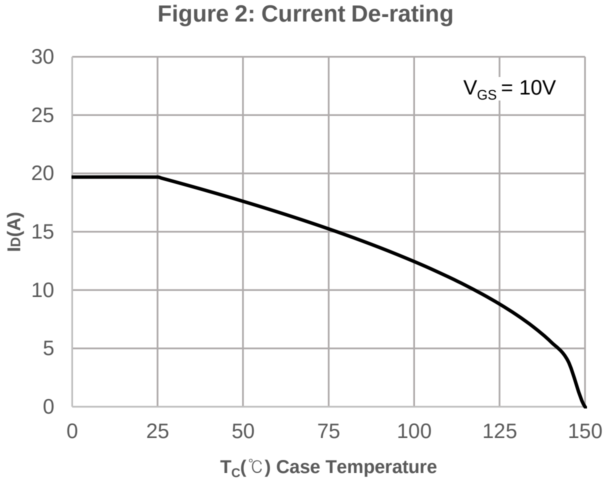


Figure 2: Current De-rating

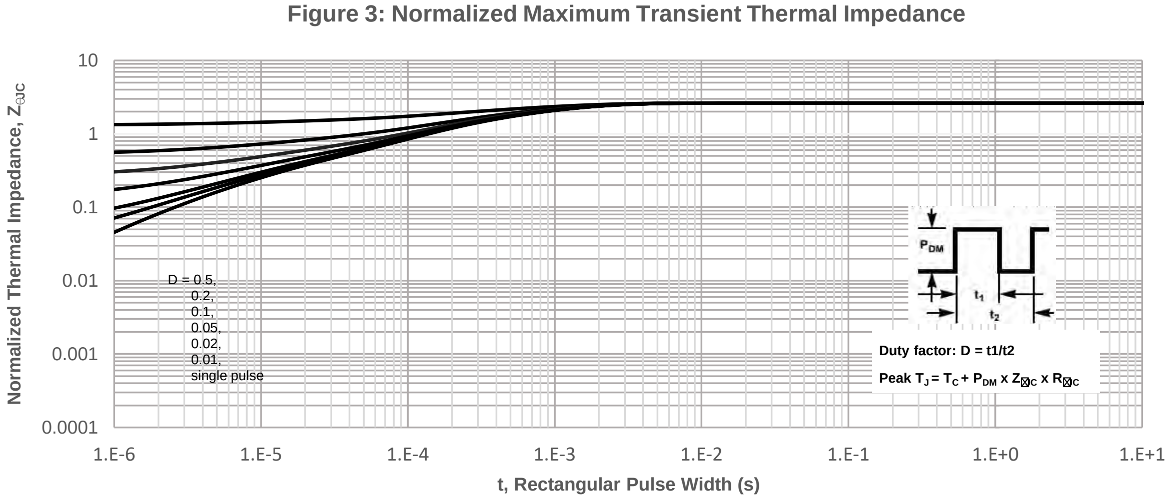


Figure 3: Normalized Maximum Transient Thermal Impedance

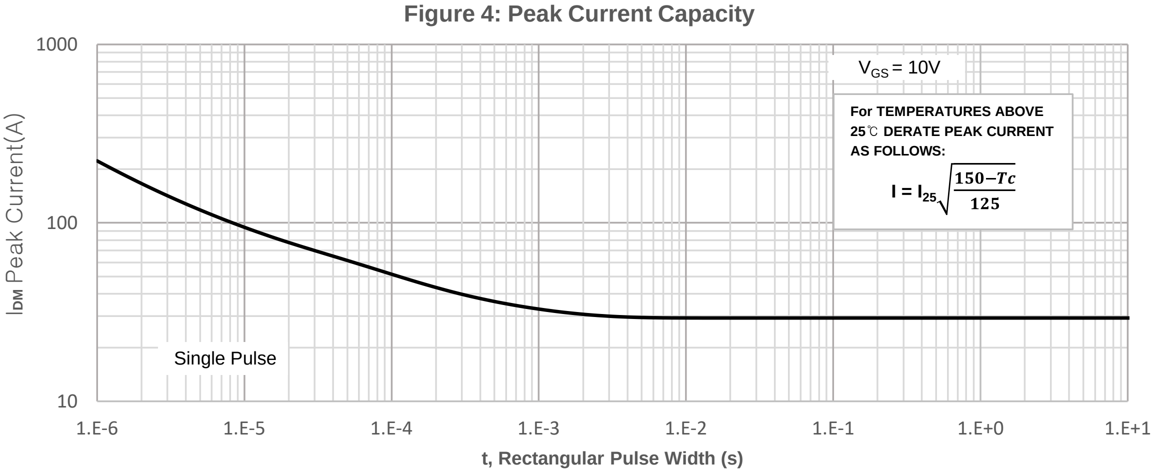


Figure 4: Peak Current Capacity

Typical Performance Characteristics

Figure 5: Output Characteristics

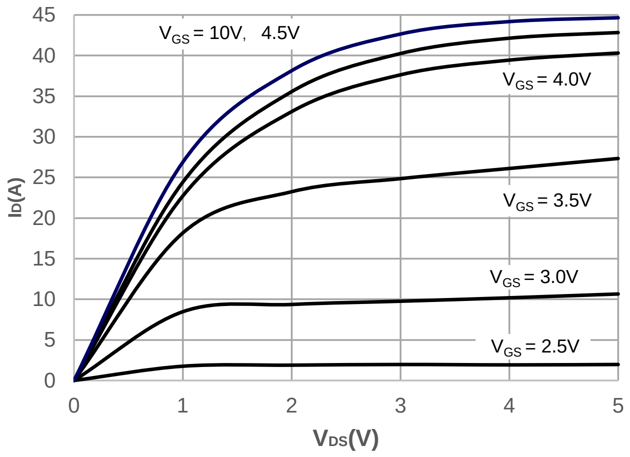


Figure 6: Typical Transfer Characteristics

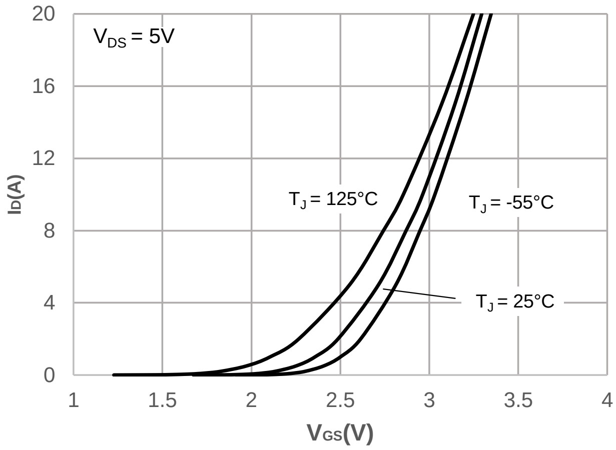


Figure 7: On-resistance vs. Drain Current

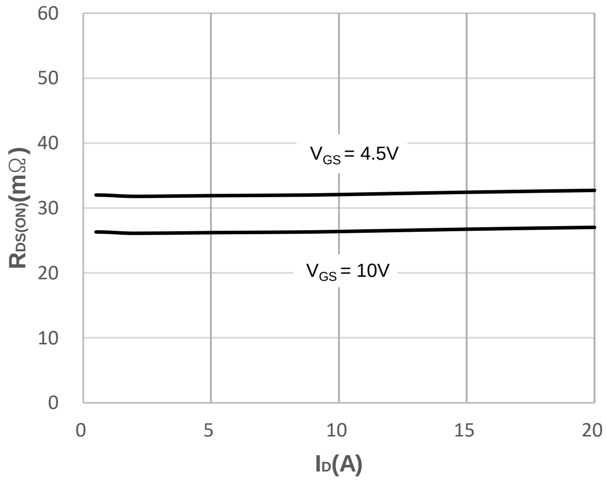


Figure 8: Body Diode Characteristics

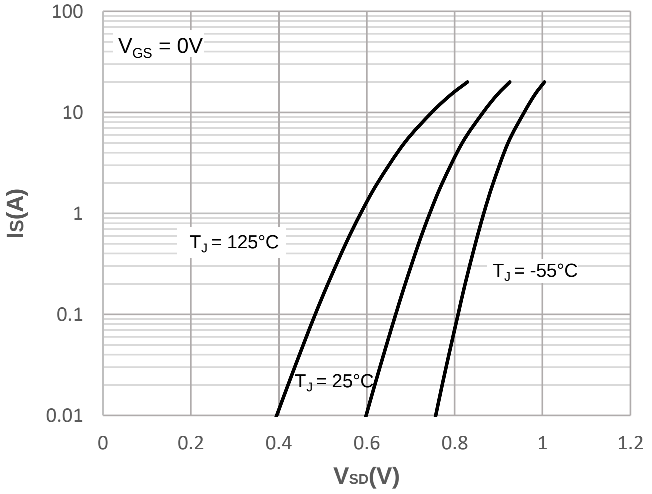


Figure 9: Gate Charge Characteristics

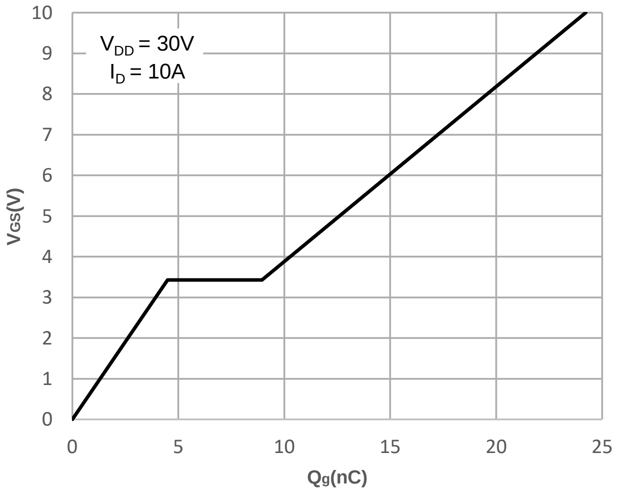
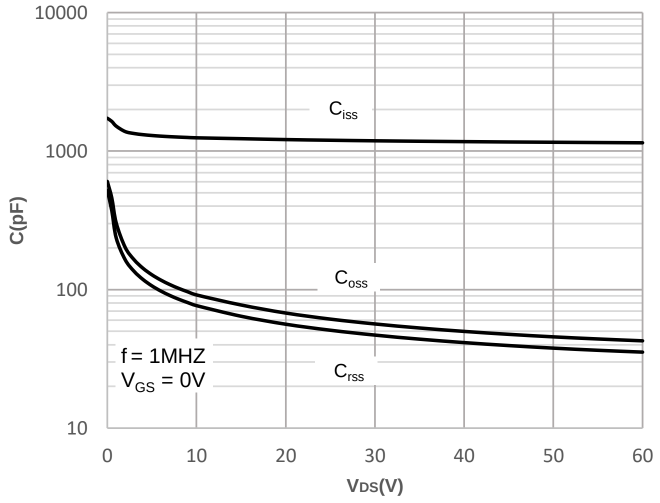


Figure 10: Capacitance Characteristics



60V N-Channel MOSFET

Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

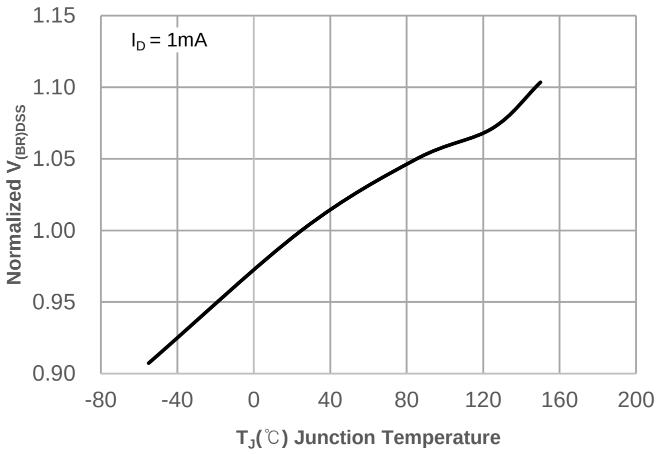


Figure 12: Normalized on Resistance vs. Junction Temperature

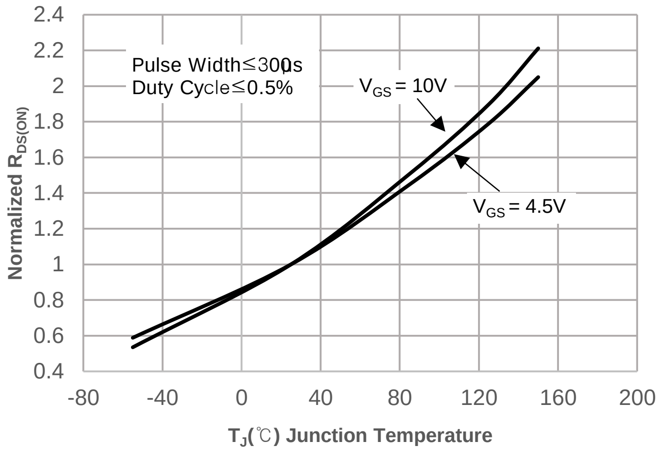


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

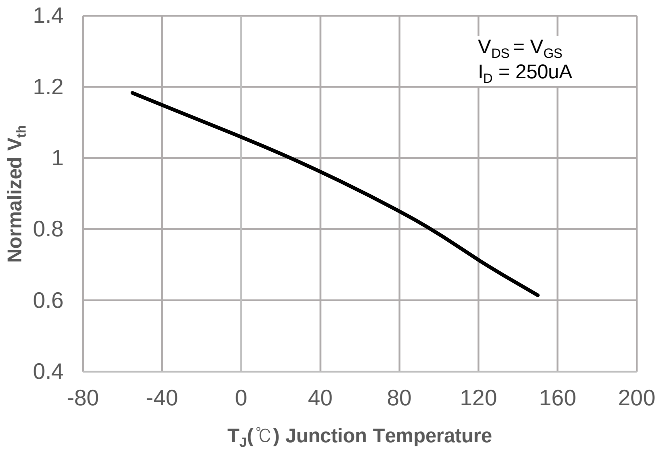


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

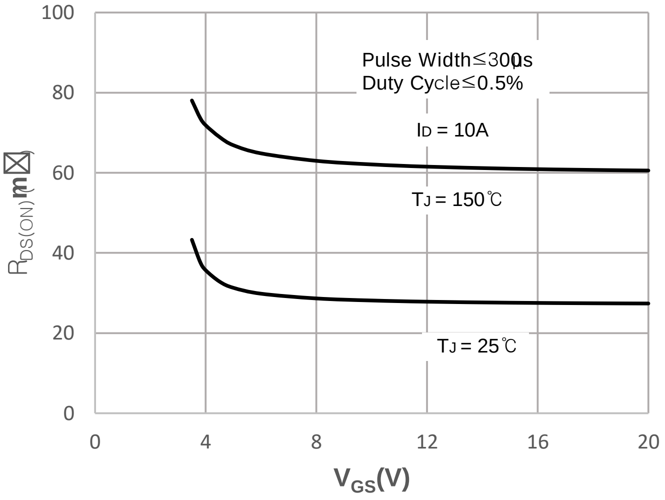
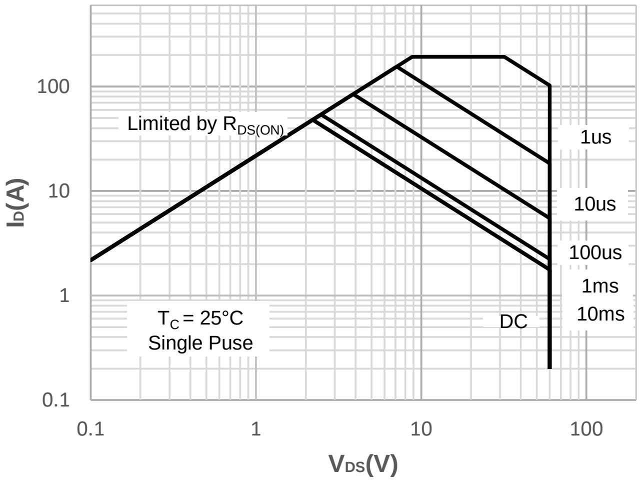


Figure 15: Maximum Safe Operating Area



Test Circuit

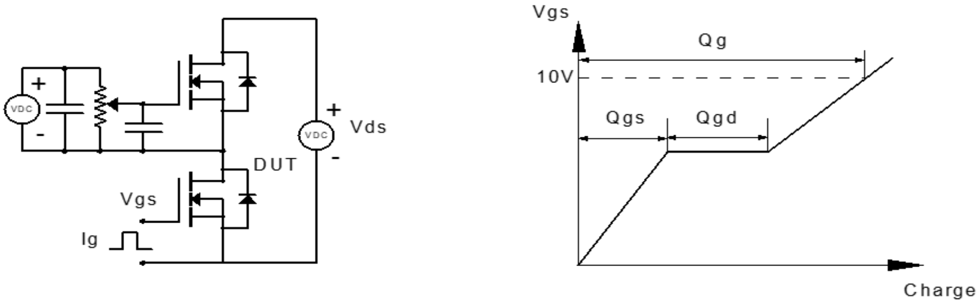


Figure 1: Gate Charge Test Circuit & Waveform

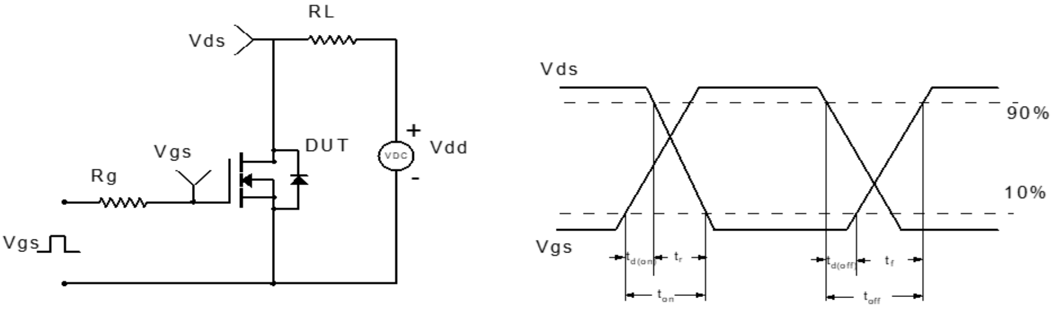


Figure 2: Resistive Switching Test Circuit & Waveform

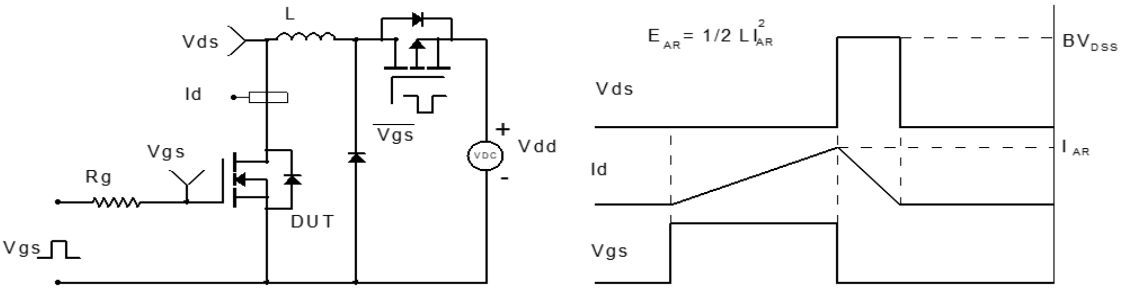


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

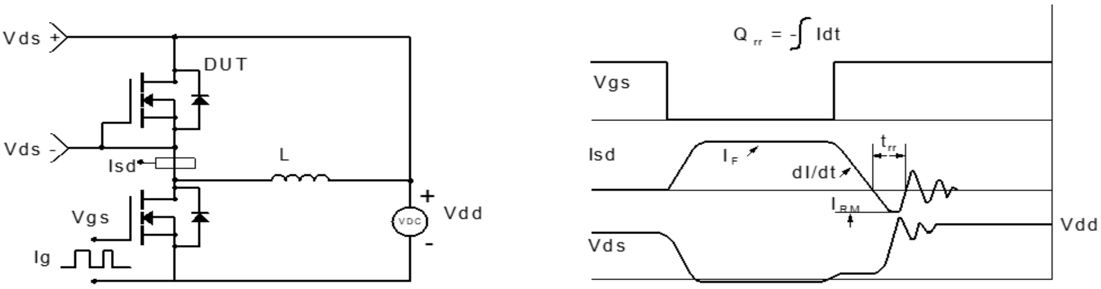
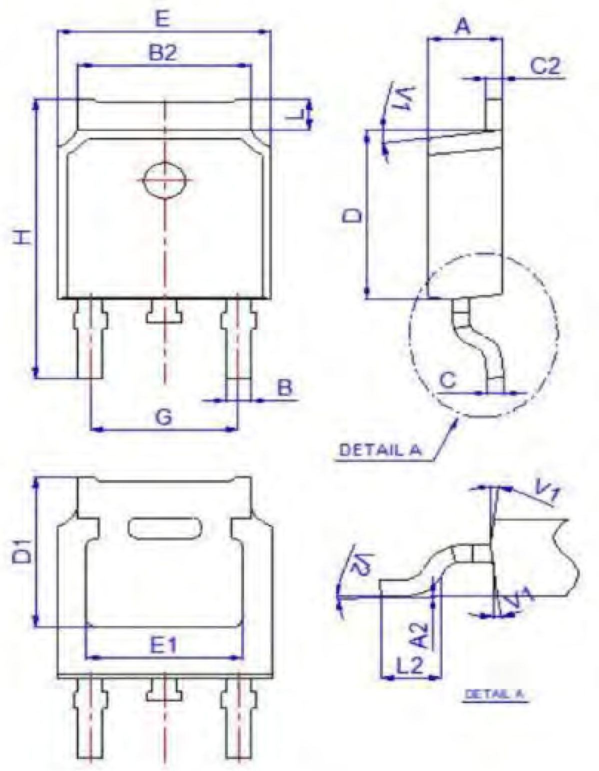
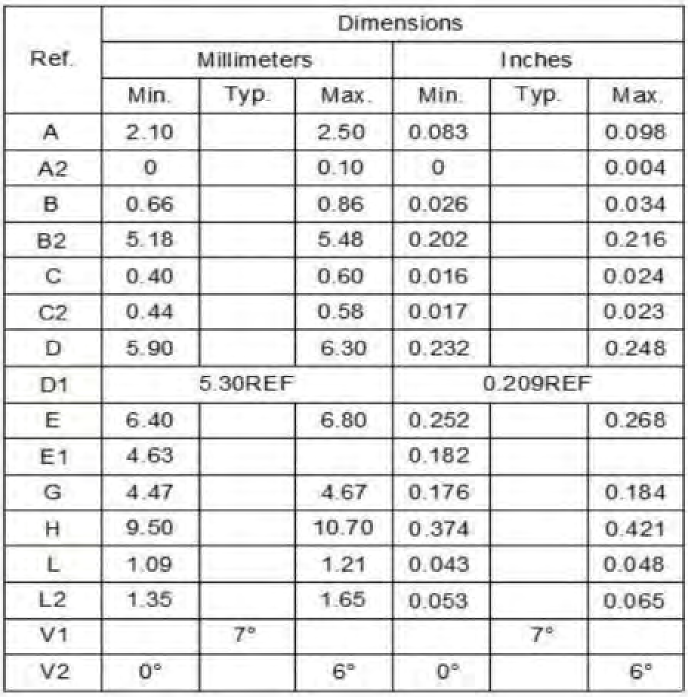


Figure 4: Diode Recovery Test Circuit & Waveform

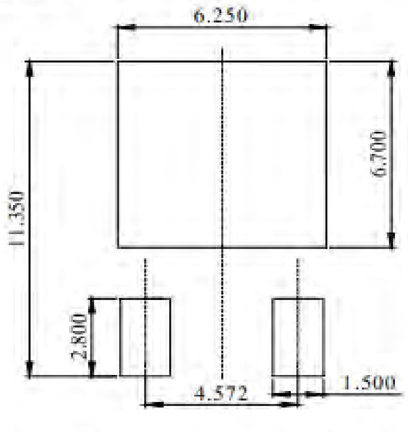
Package Mechanical Data(TO-252-3L)





Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Recommended Soldering Footprint



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