

Product Summary

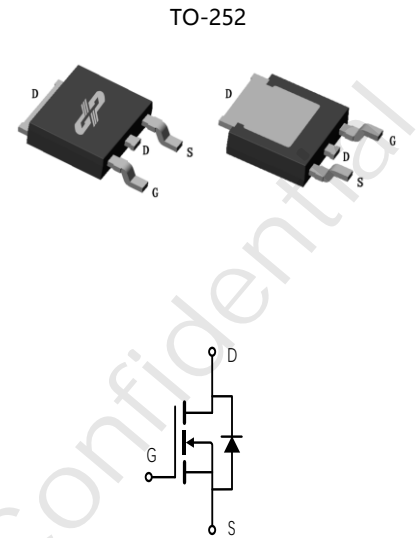
Part #	V _{DS}	R _{DS(on).typ} (@V _{GS} =4.5V)	R _{DS(on).typ} (@V _{GS} =2.5V)	I _D
DP2060	20V	2.7mΩ	3.4mΩ	90A

Features

- Advanced high cell density Trench MOSFET technology
- Better R_{DS(on)} enabled by a low R_{DSon.spr}, low conduction losses
- Excellent Q_gxR_{DS(on)} product(FOM)
- Qualified according to JEDEC criteria

Applications

- Battery management
- Power Management Switches



100% Avalanche Tested

 100% R_g Tested

Package Marking and Ordering Information

Part #	Marking	Package	Packing
DP2060	DP2060	TO-252	Tube/Reel


Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DS}	20	V
Continuous drain current	I _D	90	A
T _C = 25°C		76	
T _C = 100°C			
Pulsed drain current (T _C = 25°C, t _p limited by T _{jmax})	I _{D pulse}	360	A
Avalanche energy, single pulse (I=0.1mA, R _g =25) ^[1]	E _{AS}	55	mJ
Gate-Source voltage	V _{GS}	±10	V
Power dissipation (T _C = 25°C)	P _{tot}	83	W
Operating junction and storage temperature	T _j , T _{stg}	-55...+150	°C

 [1].EAS is tested at starting T_j = 25°C, V_{GS} = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R _{thJC}	1.5	°C/W
Thermal resistance, junction – ambient(min. footprint)	R _{thJA}	50	

Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	20	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	0.45	-	1	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=20V, V_{GS}=0V$ $T_j=25^\circ\text{C}$
		-	-	100		$T_j=150^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 10V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.7	3.4	mΩ	$T_j=25^\circ\text{C}$ $V_{GS}=4.5V, I_D=20A$
		-	3.4	4.3		$V_{GS}=2.5V, I_D=20A$

Dynamic Characteristic^[2]

Input Capacitance	C_{iss}	-	3554	-	pF	$V_{GS}=0V, V_{DS}=10V,$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	702	-		
Reverse Transfer Capacitance	C_{rss}	-	588	-		
Gate Total Charge($V_{GS}=10V$)	Q_g	-	36	-	nC	$V_{GS}=10V, V_{DS}=10V,$ $I_D=20A, f=1\text{MHz}$
Gate Total Charge($V_{GS}=4.5V$)	Q_g	-	24	-		
Gate-Source charge	Q_{gs}	-	8	-		
Gate-Drain charge	Q_{gd}	-	13	-		
Turn-on delay time	$t_{d(on)}$	-	7	-	ns	$V_{GS}=4.5V, V_{DD}=10V,$ $R_{G_ext}=2.7\Omega$
Rise time	t_r	-	21	-		
Turn-off delay time	$t_{d(off)}$	-	32	-		
Fall time	t_f	-	20	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.81	1.1	V	$V_{GS}=0V, I_{SD}=20A$
Diode continuous forward current	I_s	-	-	90	A	$T_C = 25^\circ C$
Diode pluse current	$I_{s\ pluse}$	-	-	360	A	$T_C = 25^\circ C$
Body Diode Reverse Recovery Time ^[2]	t_{rr}	-	49	-	ns	$I_F=20A, di/dt=100A/\mu s$
Body Diode Reverse Recovery Charge ^[2]	Q_{rr}	-	32	-	nC	

[2]. Defined by design. Not subject to production test

Typical Performance Characteristics

Fig 1: Output Characteristics

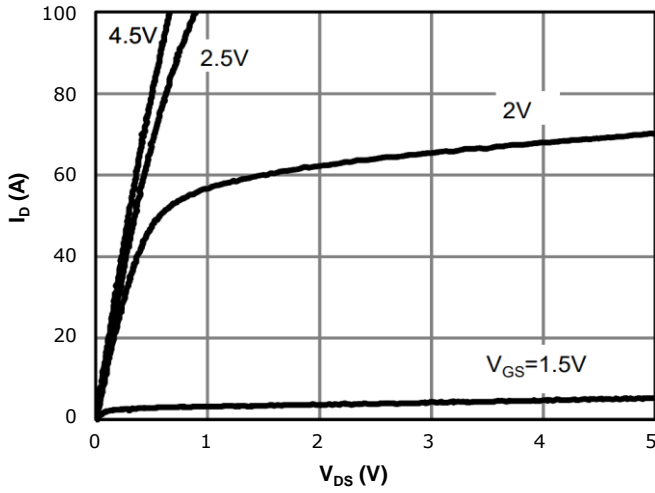


Fig 2: Transfer Characteristics

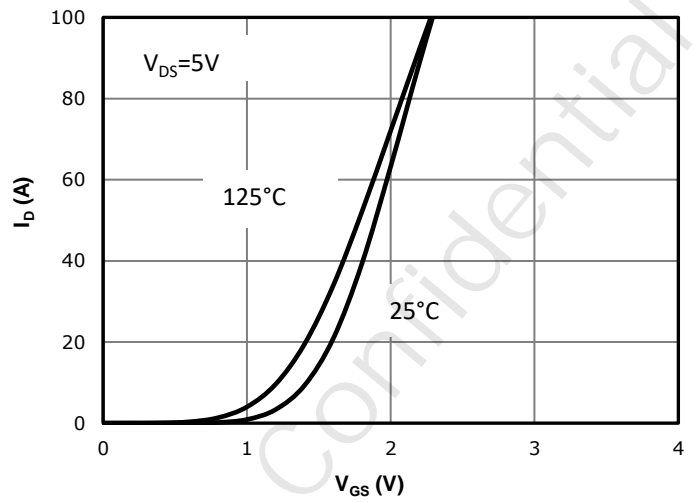


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

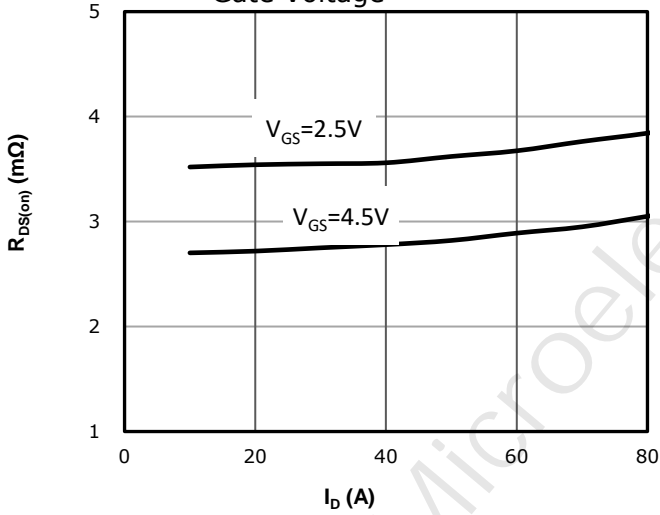


Fig 4: $R_{DS(on)}$ vs Gate Voltage

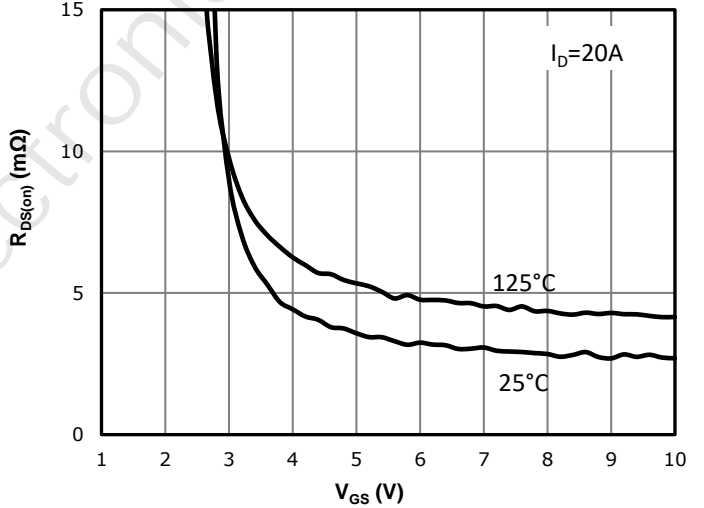


Fig 5: $R_{DS(on)}$ vs. Temperature

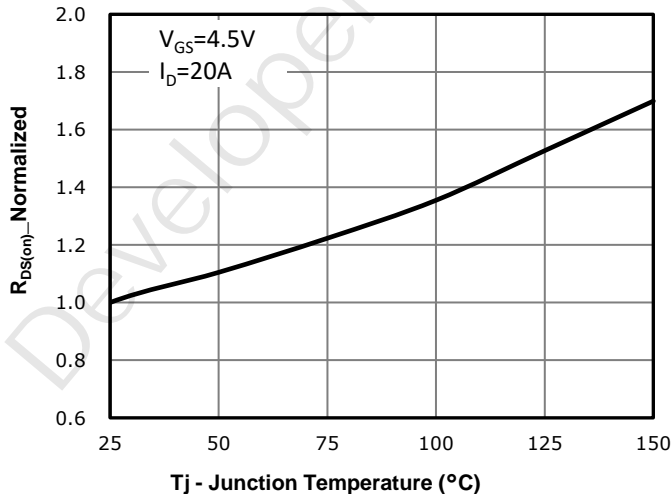


Fig 6: Capacitance Characteristics

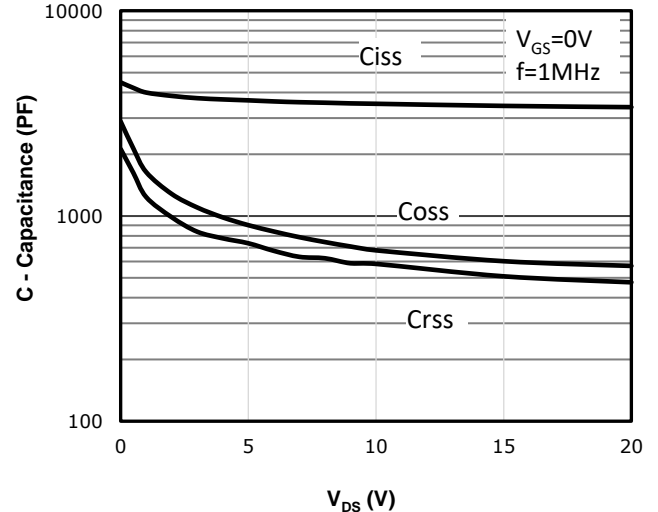


Fig 7: Gate Charge Characteristics

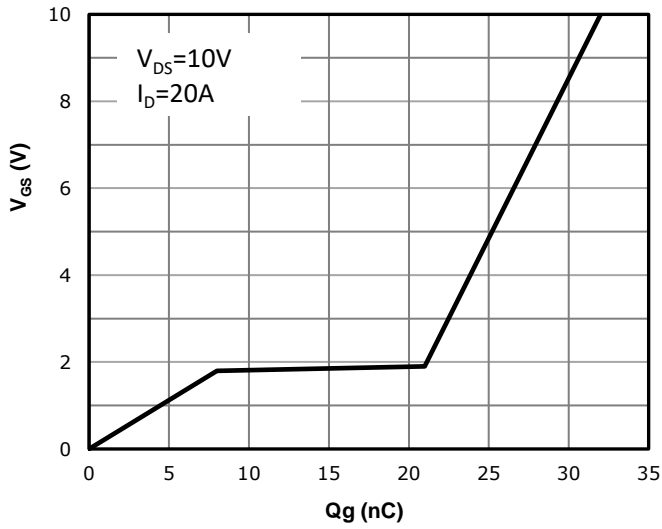


Fig 8: Body-diode Forward Characteristics

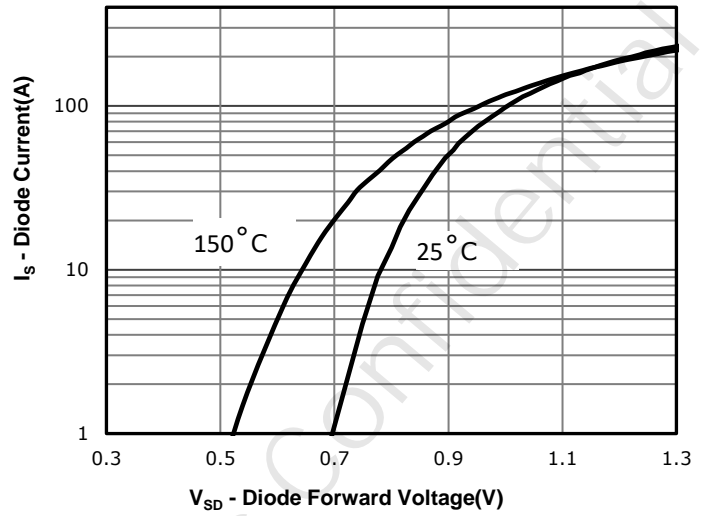


Fig 9: Power Dissipation

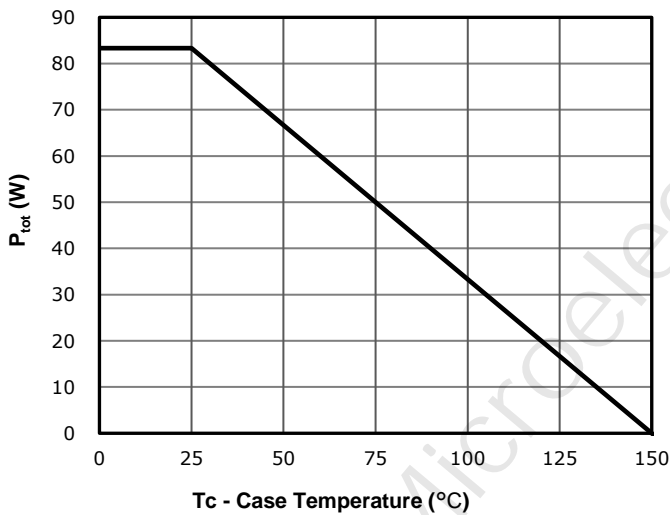


Fig 10: Drain Current Derating

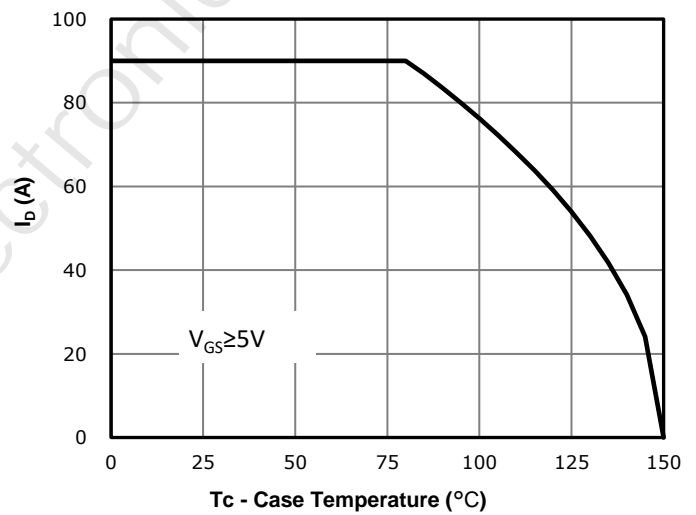


Fig 11: Safe Operating Area

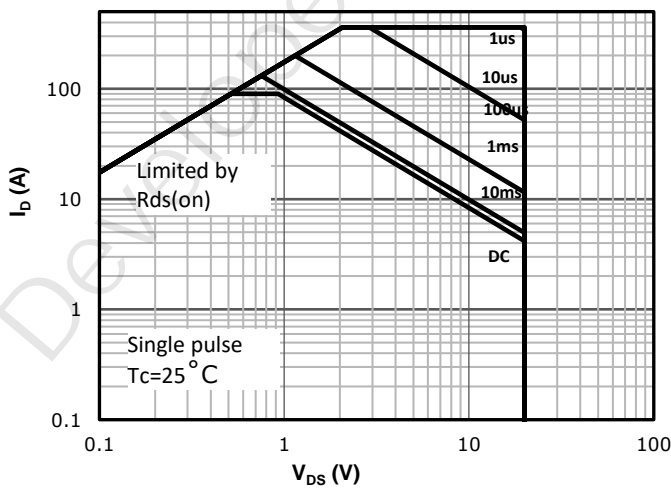
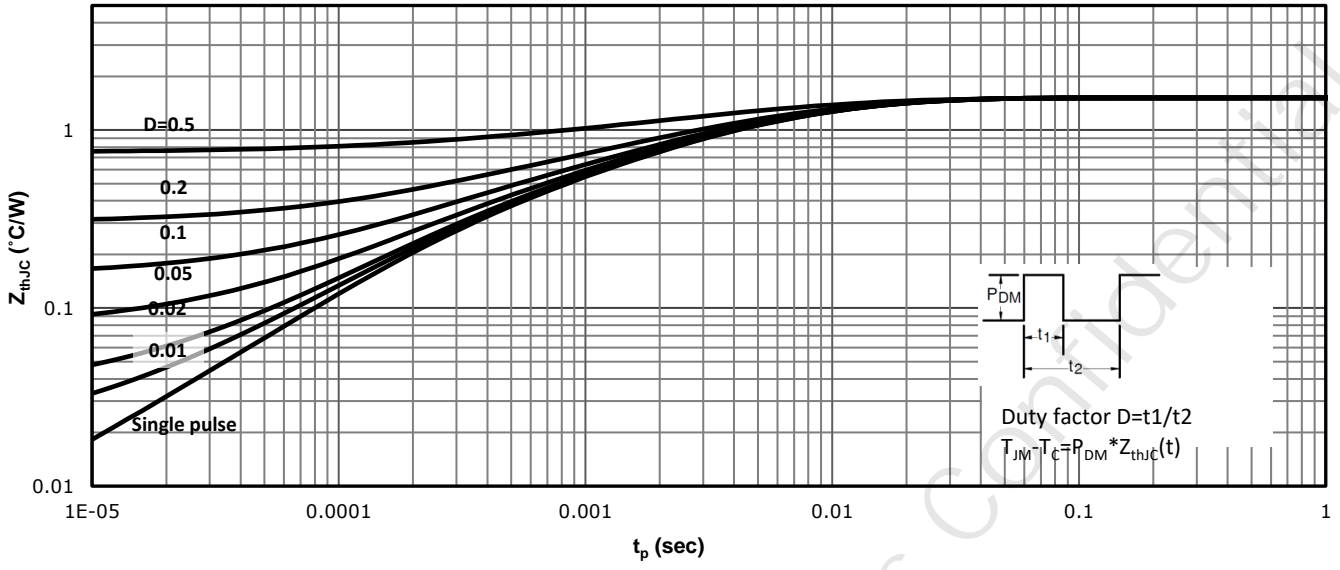
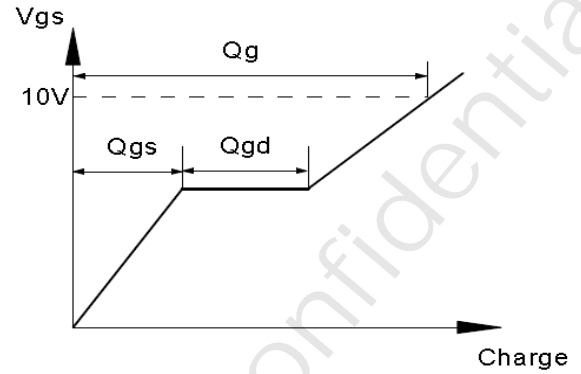
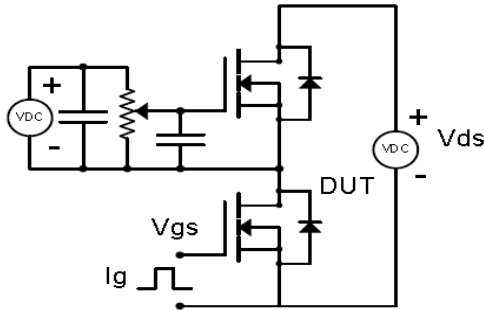


Fig 12: Max. Transient Thermal Impedance

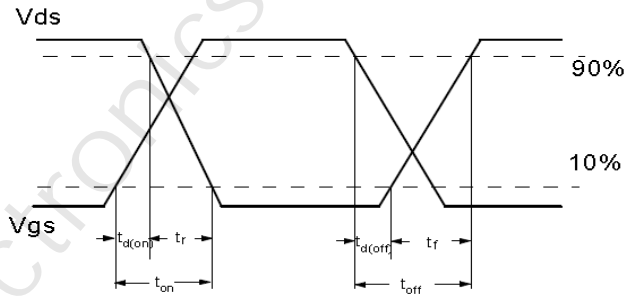
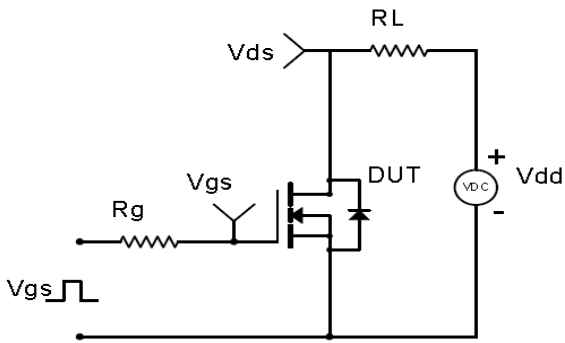


Test Circuit & Waveform

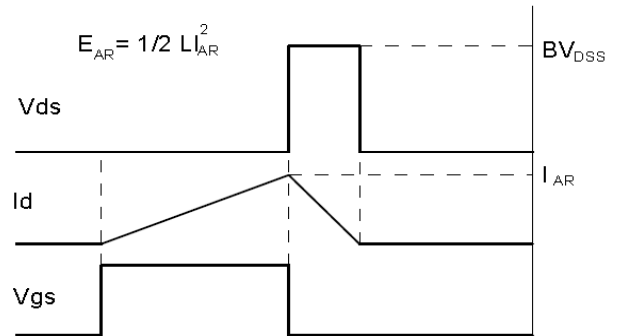
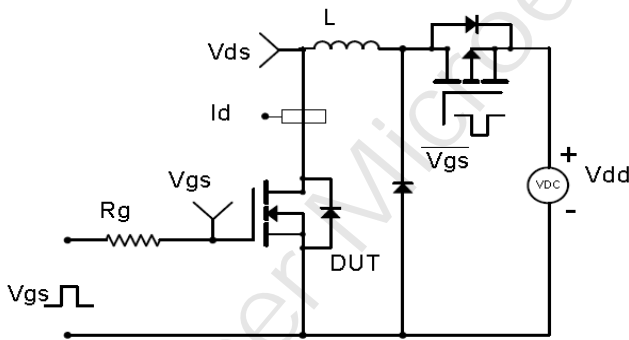
Gate Charge Test Circuit & Waveform



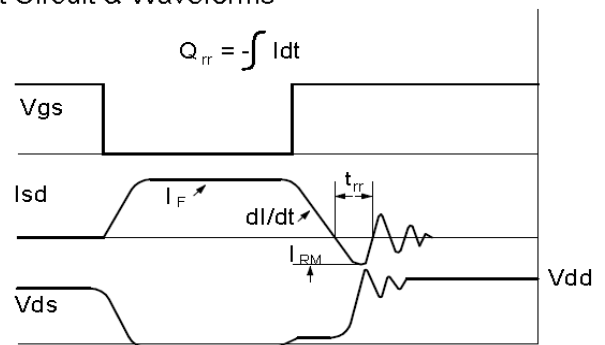
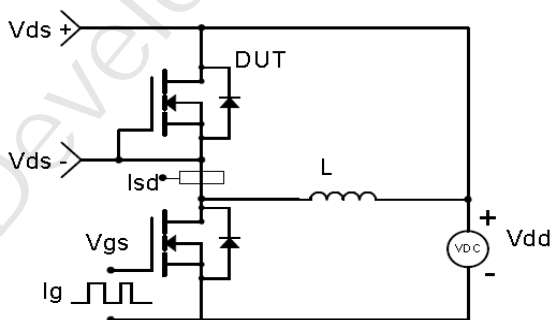
Resistive Switching Test Circuit & Waveforms

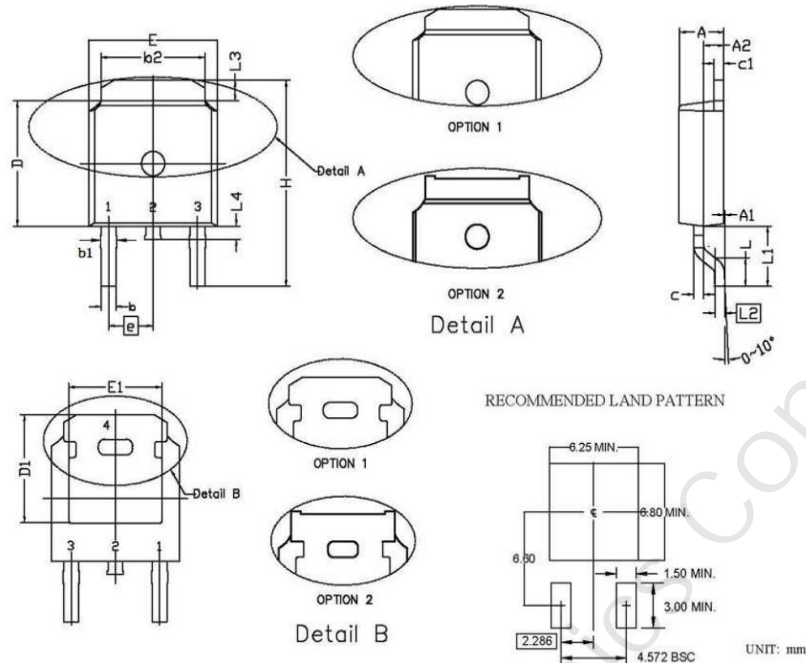


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
A1	0.00	0.15	0.000	0.006
A2	0.76	1.36	0.030	0.054
b	0.60	0.91	0.024	0.036
b1	0.65	1.15	0.026	0.045
b2	5.00	5.64	0.197	0.222
c	0.45	0.61	0.018	0.024
c1	0.36	0.66	0.014	0.026
D	5.80	6.30	0.228	0.248
D1	5.00	6.00	0.197	0.236
e	2.29 BSC.		0.090 BSC.	
E	6.30	6.90	0.248	0.272
E1	4.55	5.30	0.179	0.209
H	9.40	10.48	0.370	0.413
L	1.18	1.70	0.046	0.067
L1	2.92 REF		0.115 REF	
L2	0.36	0.66	0.014	0.026
L3	0.72	1.35	0.028	0.053
L4	0.60	1.20	0.024	0.047

Revision History

Revision	Major changes
1.5	Release for formal version

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