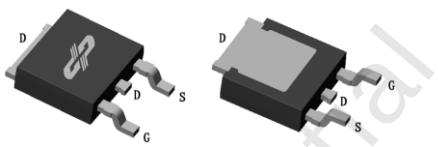
DPM080R500D3G1

N-Channel Silicon Carbide MOSFET

Product Summary

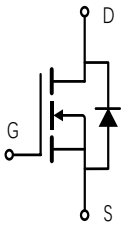
Part #	V_{DS}	$R_{DS(on)}$	I_D (T_{vj}=25℃)
DPM080R500D3G1	800V	490mΩ	6A

TO-252



Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to parallel
- RoHS Compliant



Applications

- General purpose drives
- Energy storage systems
- String inverter
- Uninterruptible power supplies

Package Marking and Ordering Information

Part #	Marking	Package	Packing
DPM080R500D3G1	M080R500D3	TO-252	Tape/Reel

Halogen-Free

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	800	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 6 4.7	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	24	A
Gate-source voltage, max. transient voltage	V_{GSmax}	-8/+22	V
Gate-source voltage, max. static voltage	V_{GSop}	-4/+18	V
Power dissipation (T_C = 25°C) Power dissipation (T_C = 100°C)	P_{tot}	25 13	W
Operating junction temperature	T_j	-40...+175	°C
Storage temperature	T_{stg}	-40...+175	°C

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Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – mounting base	R_{thMB}	6.0	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	65	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	800	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2	3 2.1	4	V	V_{DS}=V_{GS},I_D=1mA T_j=25°C T_j=175°C
Zero gate voltage drain current	I_{DSS}	-	1	10	μA	V_{DS}=640V,V_{GS}=0V T_j=25°C
Gate-source leakage current	I_{GSS}	-	-	250	nA	V_{GS}=18V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	490 610	635	mΩ	V_{GS}=18V, I_D=3.3A T_j=25°C T_j=175°C
		-	640 670	830	mΩ	V_{GS}=15V, I_D=3.3A T_j=25°C T_j=175°C
Gate resistance	R_g	-	35	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz
Dynamic Characteristic[2]						
Input Capacitance	C_{iss}	-	115	-	pF	V_{GS}=0V, V_{DS}=600V, f=1MHz
Output Capacitance	C_{oss}	-	18	-		
Reverse Transfer Capacitance	C_{rss}	-	2.8	-		
Gate Total Charge	Q_g	-	7.3	-	nC	V_{GS}=-4/18V, V_{DS}=400V, I_D=3.3A, f=1MHz
Gate-Source charge	Q_{gs}	-	1.2	-		
Gate-Drain charge	Q_{gd}	-	4.2	-		
Turn-on delay time	$t_{d(on)}$	-	4	-	ns	V_{GS}=-4/18V, V_{DD}=400V, R_{G_ext}=2.5Ω L=200μH
Rise time	t_r	-	14	-		
Turn-off delay time	$t_{d(off)}$	-	8	-		
Fall time	t_f	-	19	-		
Turn-On Energy	E_{on}	-	24	-	μJ	
Turn-Off Energy	E_{off}	-	4	-		

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	4.8 4.3	6.3	V	V_{GS}=-4V,I_{SD}=1.7A T_j=25°C T_j=175°C
Diode continuous forward current	I_s		6 2.5	- -	A	V_{GS}=0V T_C = 25°C T_C = 100°C
Diode Peak reverse recovery Current	I_{rrm}	-	2	-	A	VGS=-4V,V_R=400V I_{SD}=1.7A, dI/dt=1990A/μs
Body Diode Reverse Recovery Time[2]	t_{rr}	-	45	-	ns	
Body Diode Reverse Recovery Charge[2]	Q_{rr}	-	54	-	μC	

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

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Typical Performance Characteristics

Fig 1: Output Characteristics
Tj=-40 ℃

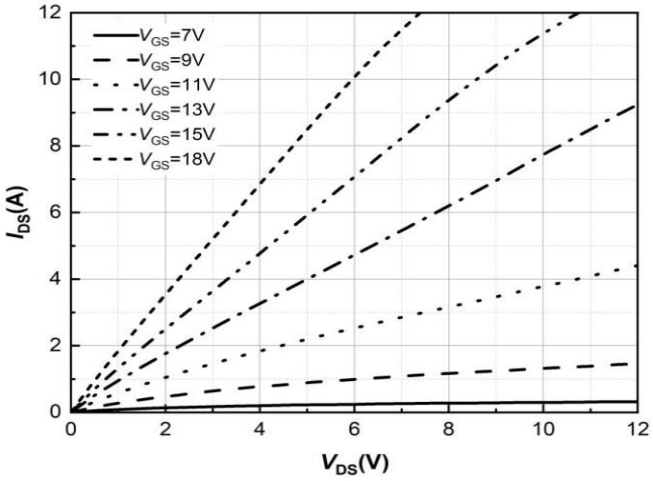


Fig 2: Output Characteristics
Tj=25℃

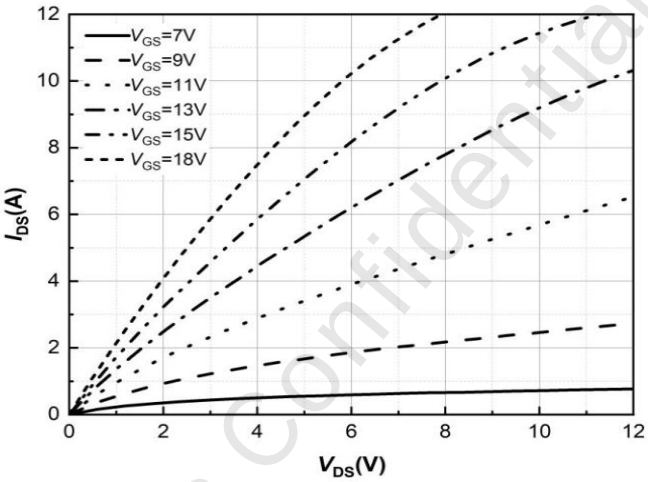


Fig 3: Output Characteristics
Tj=175℃

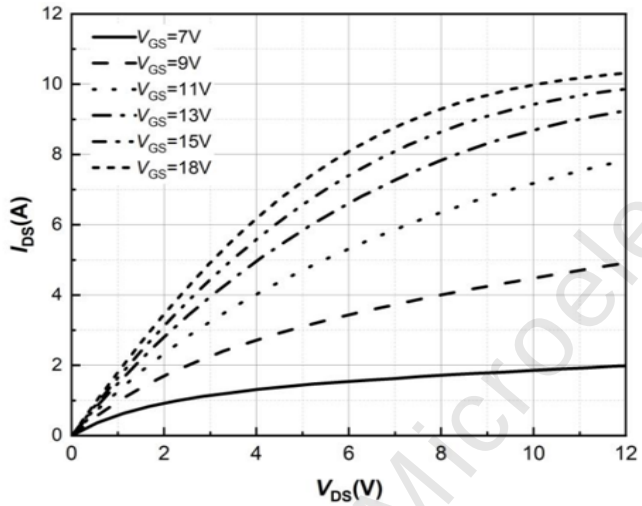


Fig 4: Rds(on) vs Drain Current for various Temperature

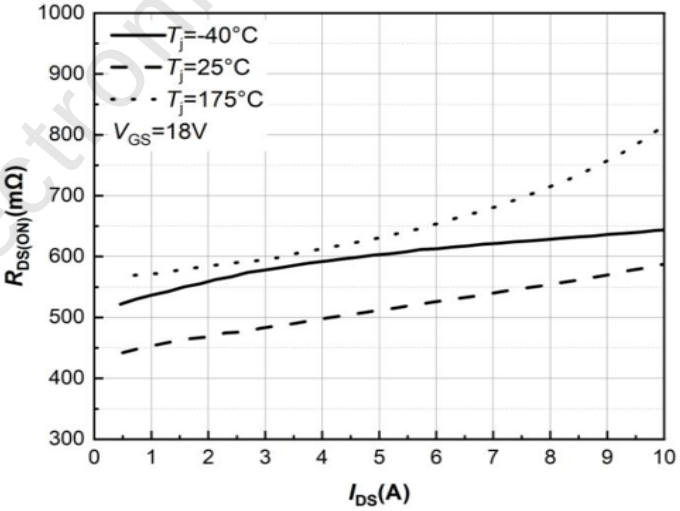


Fig 5: Rds(on) vs. Temperature

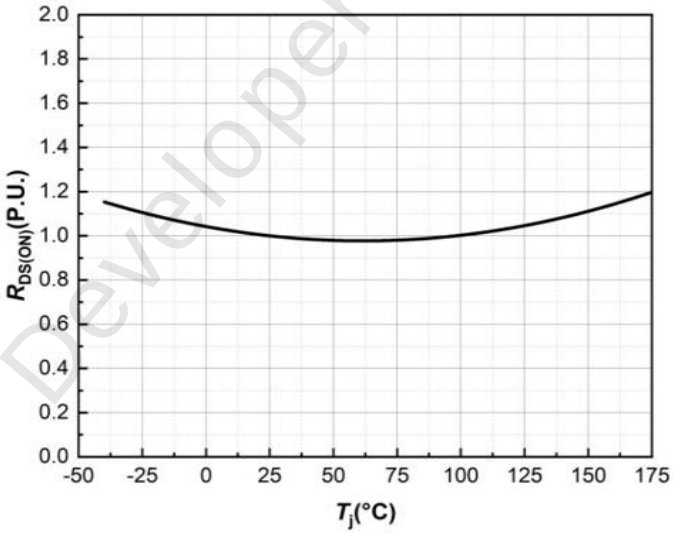
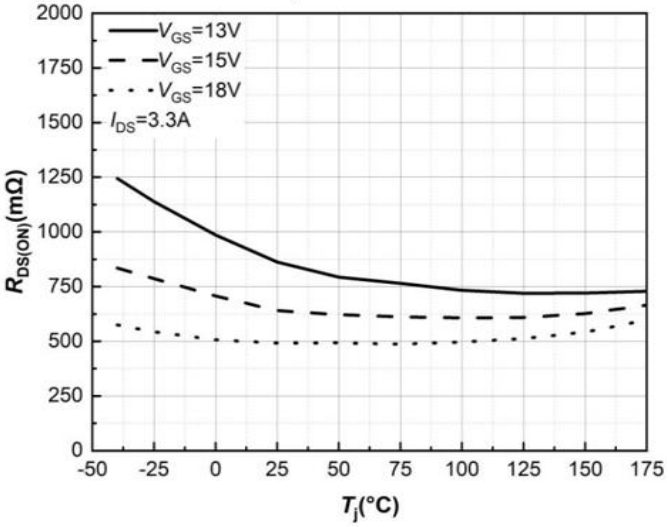


Fig 6: Rds(on) vs. Gate Voltage at Temperature



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Typical Performance Characteristics

Fig 7: Transfer Characteristics

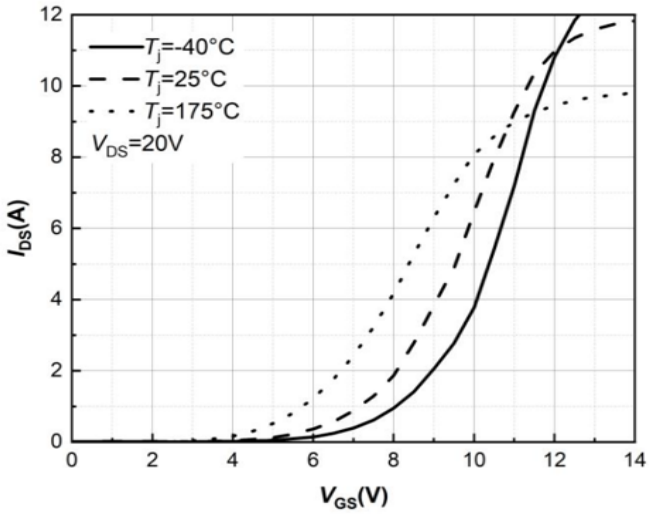


Fig 8: Body Diode Characteristic Tj=-40℃

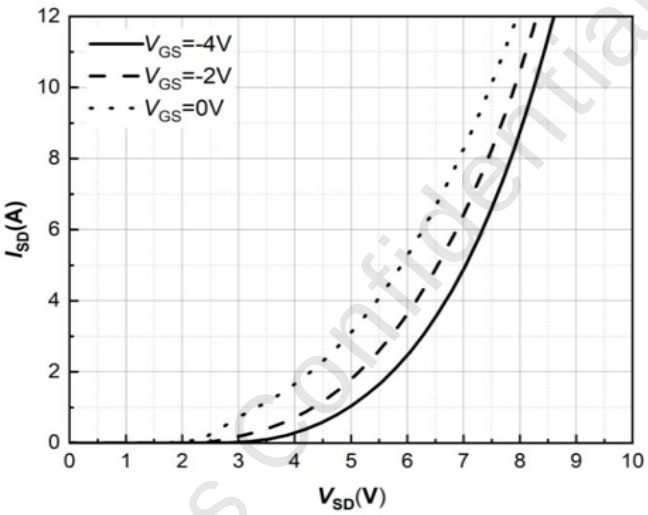


Fig 9: Body Diode Characteristic Tj=25℃

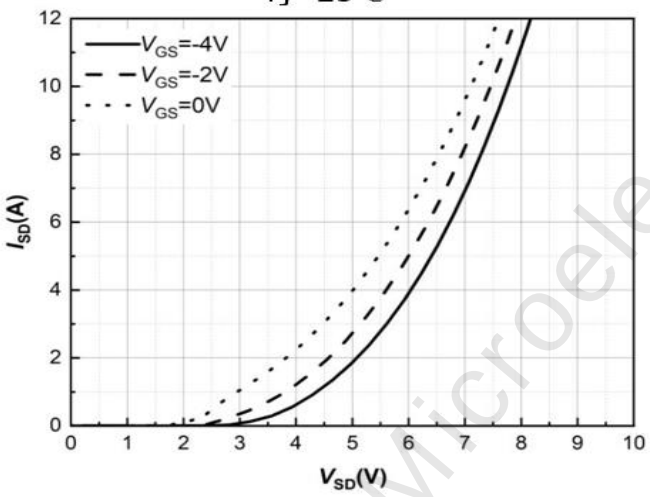


Fig 10: Body Diode Characteristic Ti=175℃

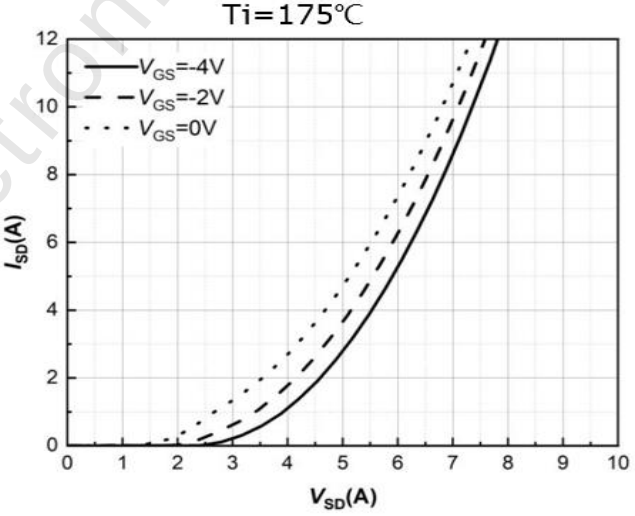


Fig 11: Threshold Voltage vs. Temperature

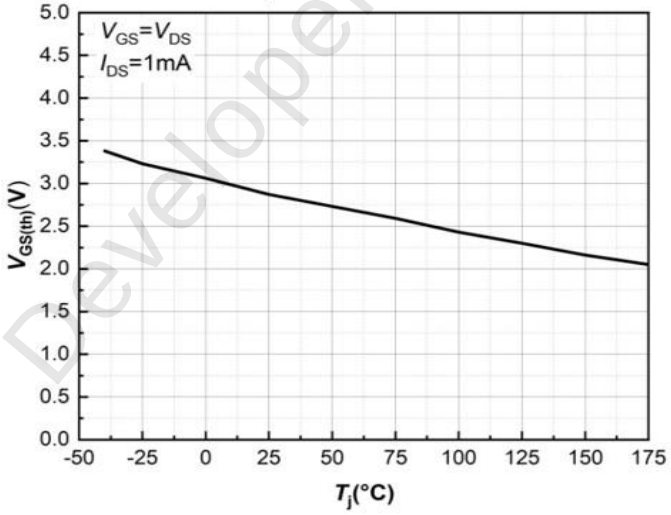
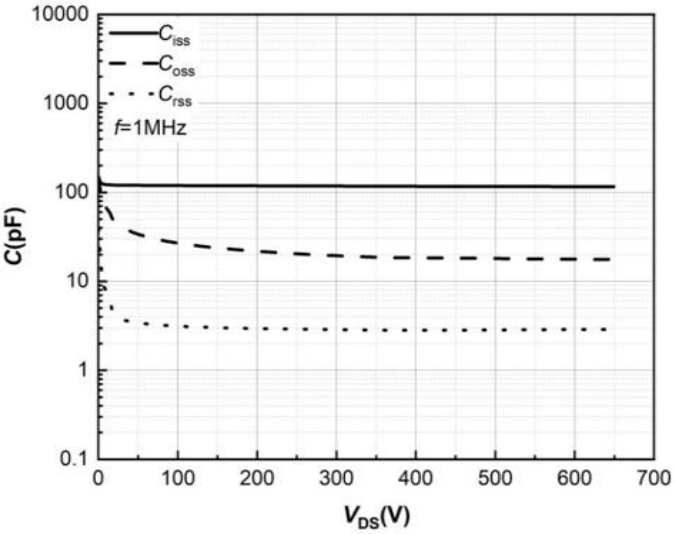


Fig 12: Capacitance Characteristics



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Fig 13: Gate Charge Characteristics

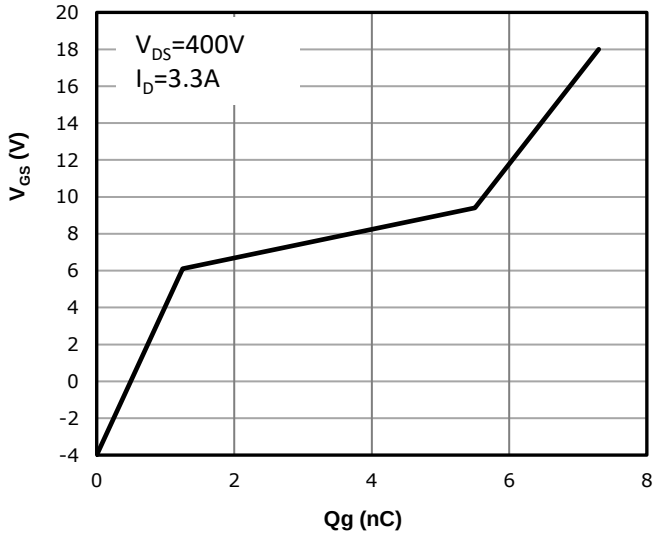


Fig 14: Clamped Inductive Switching energy vs Rg

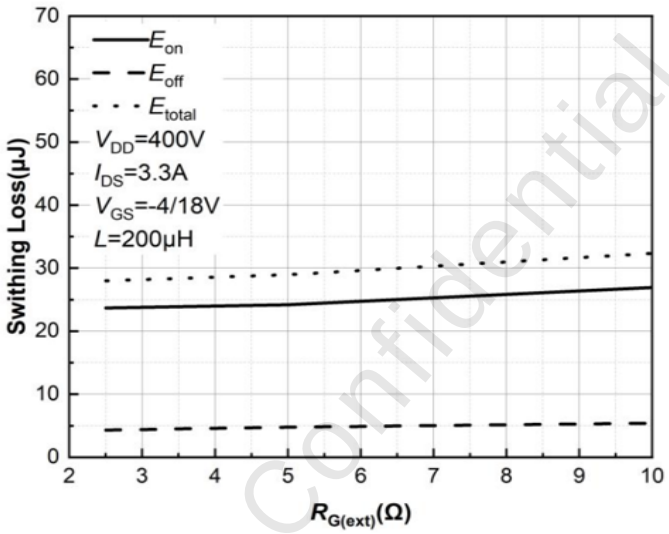


Fig 15: Power Dissipation

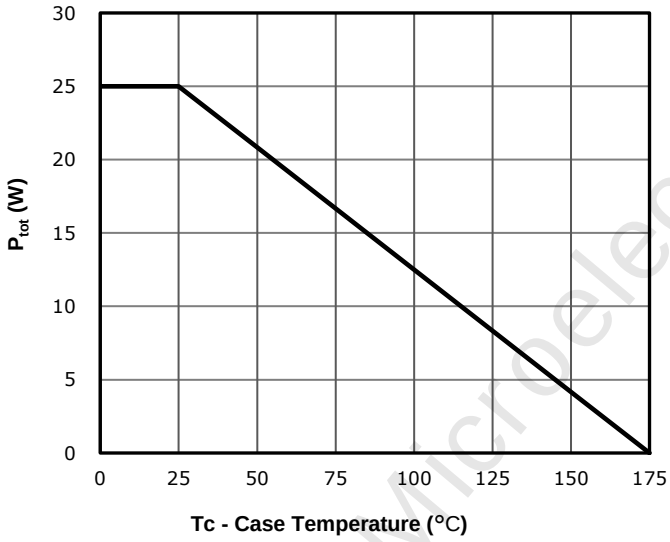


Fig 16: Drain Current Derating

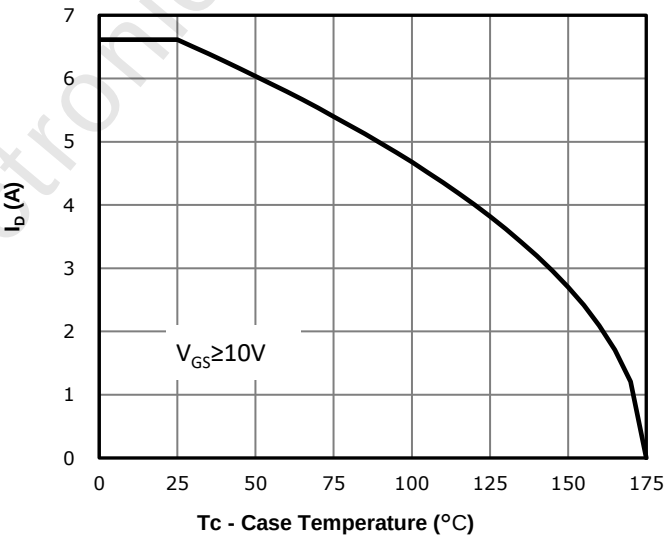
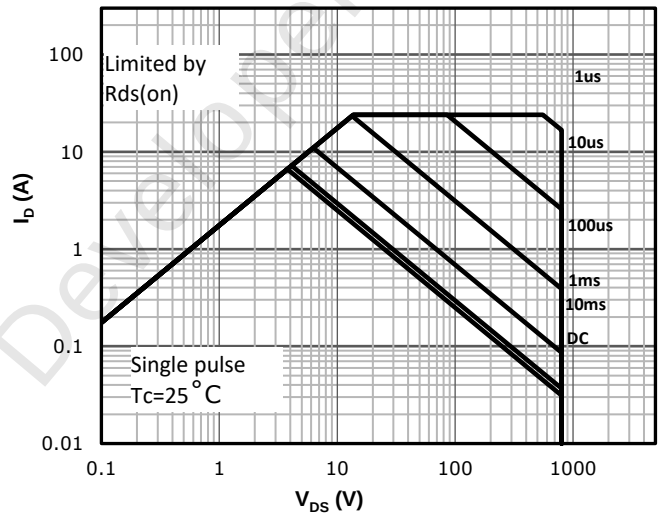
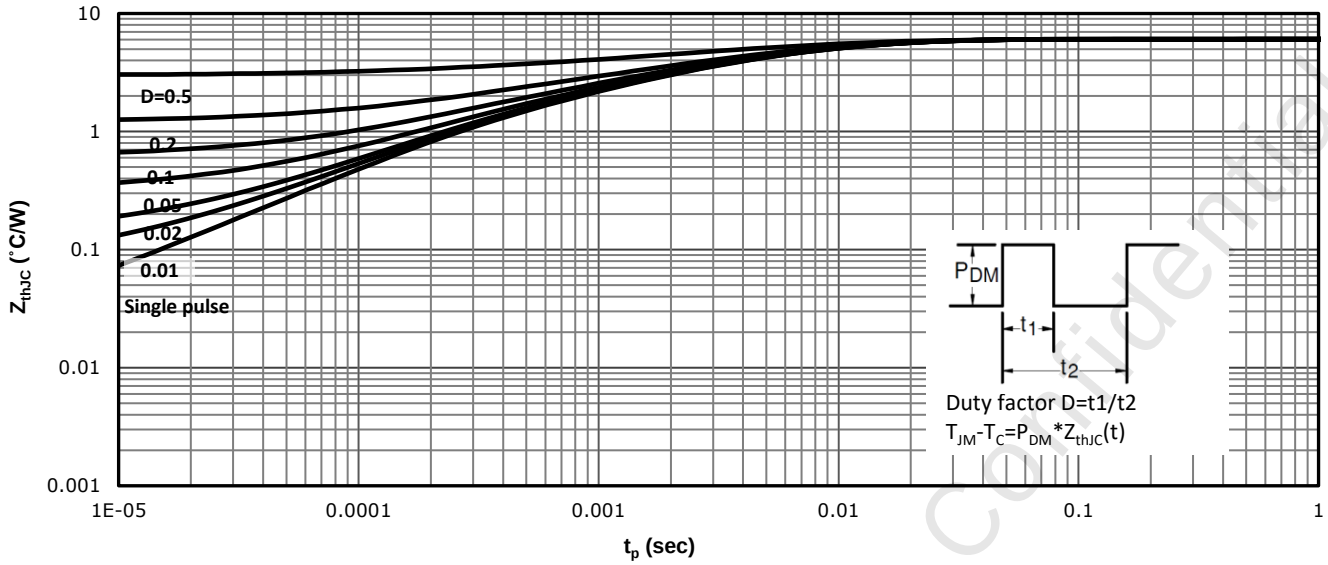


Fig 17: Safe Operating Area



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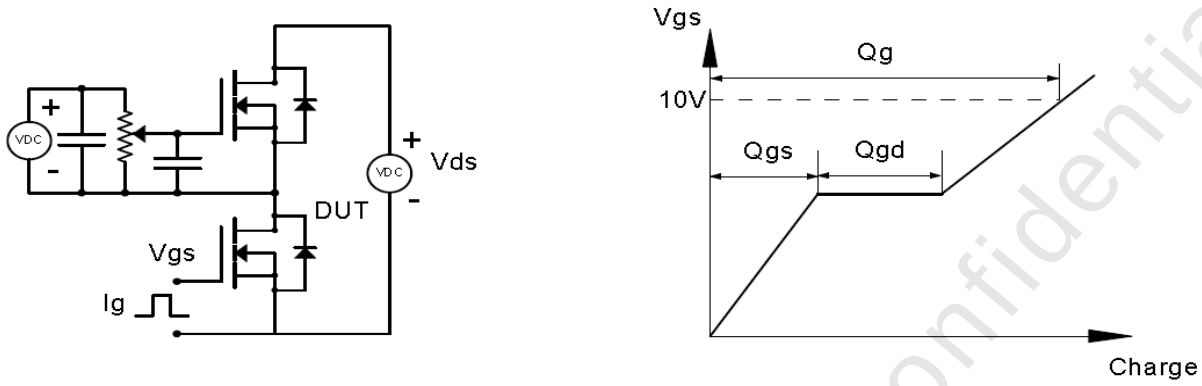
Fig 18: Max. Transient Thermal Impedance



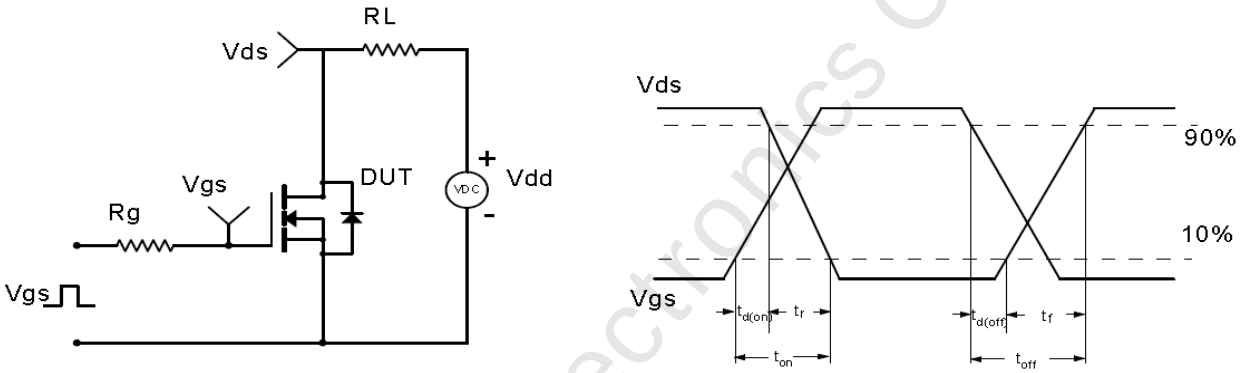
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Test Circuit & Waveform

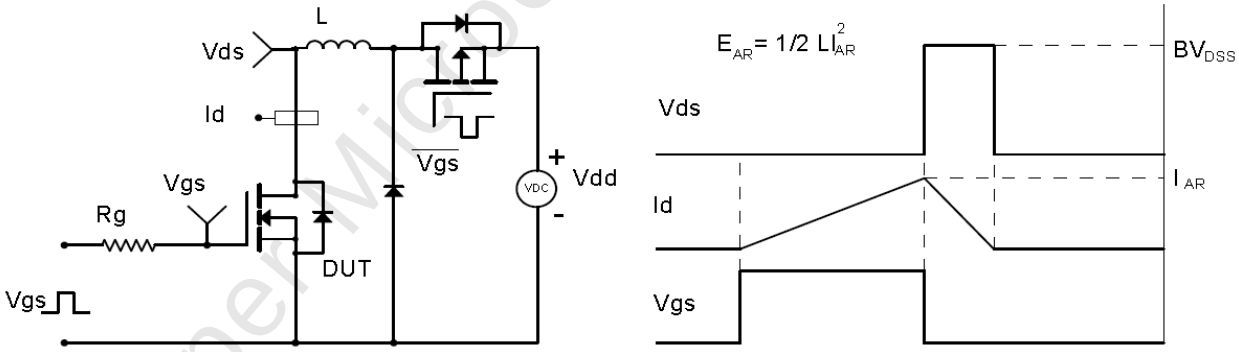
Gate Charge Test Circuit & Waveform



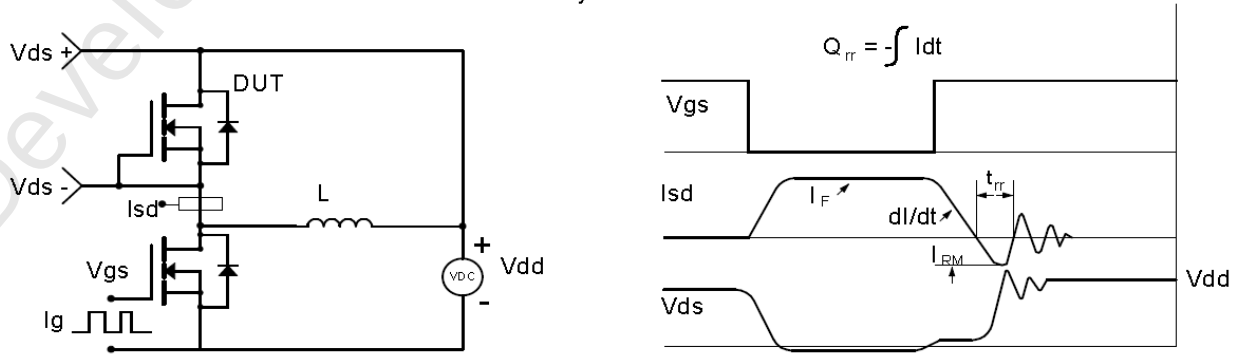
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

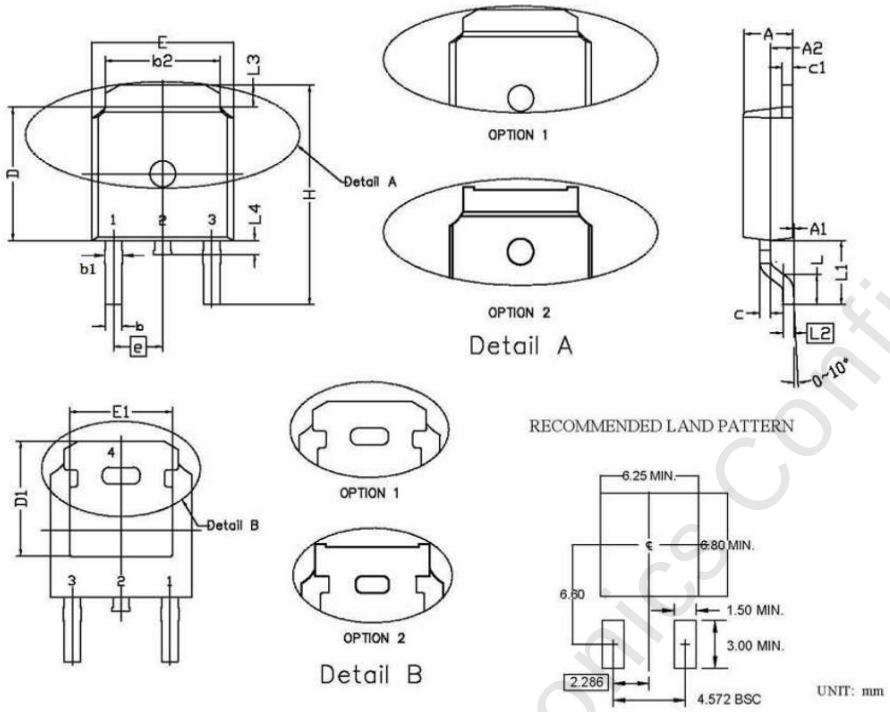


Diode Recovery Test Circuit & Waveforms



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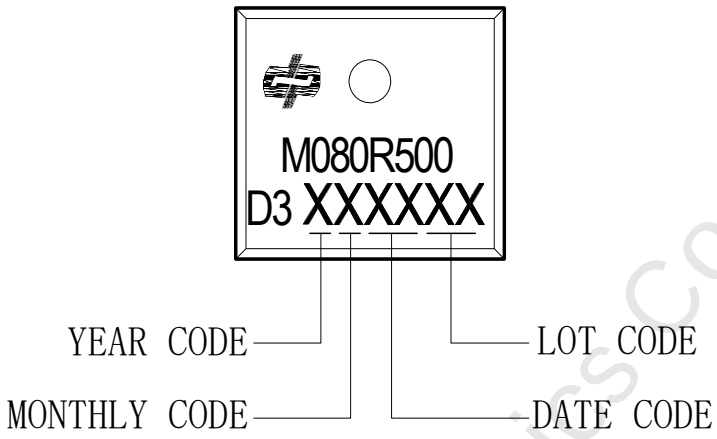
Package Outline: TO252



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

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Part Marking Information



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Revision History

Revison	Major changes
1.00	Release for formal version

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