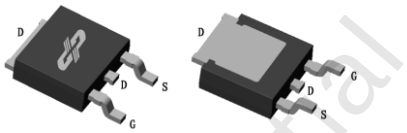
DPM065R130D3G2

N-Channel Silicon Carbide MOSFET

Product Summary

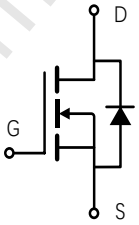
Part #	V_{DS}	$R_{DS(on)}$	I_D (T_{vj}=25℃)
DPM065R130D3G2	650V	130mΩ	20A

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
DPM065R130D3G2	M065R130D3	TO-252	Tape/Reel

Halogen-Free

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	650	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 20 14	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	80	A
Gate-source voltage, max. transient voltage	V_{GSmax}	-10/+22	V
Gate-source voltage, max. static voltage	V_{GSop}	0/+15	V
Power dissipation (T_C = 25°C) Power dissipation (T_C = 100°C)	P_{tot}	83 42	W
Operating junction temperature	T_j	-40...+175	°C
Storage temperature	T_{stg}	-40...+175	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – mounting base	R_{thMB}	1.8	°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}	650	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.7	3.3 2.3		V	V_{DS}=V_{GS},I_D=3.5mA T_j=25°C T_j=175°C
Zero gate voltage drain current	I_{DSS}	-	0.1	20	μA	V_{DS}=650V,V_{GS}=0V T_j=25°C
Gate-source leakage current	I_{GSS}	-	-	250	nA	V_{GS}=22V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	160 164	208	mΩ	V_{GS}=15V, I_D=10A T_j=25°C T_j=175°C
		-	130 135	162	mΩ	V_{GS}=18V, I_D=10A T_j=25°C T_j=175°C
Gate resistance	R_g	-	28	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz
Dynamic Characteristic[2]						
Input Capacitance	C_{iss}	-	430	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
Output Capacitance	C_{oss}	-	30	-		
Reverse Transfer Capacitance	C_{rss}	-	2.7	-		
Gate Total Charge	Q_g	-	15	-	nC	V_{GS}=0/15V, V_{DS}=400V, I_D=10A, f=1MHz
Gate-Source charge	Q_{gs}	-	5.5	-		
Gate-Drain charge	Q_{gd}	-	2.2	-		
Turn-on delay time	$t_{d(on)}$	-	22	-	ns	V_{GS}=0/15V, V_{DD}=400V, R_{G_ext}=2.2Ω L=600μH
Rise time	t_r	-	14	-		
Turn-off delay time	$t_{d(off)}$	-	25	-		
Fall time	t_f	-	14	-		
Turn-On Energy	E_{on}	-	105	-	μJ	
Turn-Off Energy	E_{off}	-	24	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.5 3.1		V	V_{GS}=0V,I_{SD}=5A T_j=25°C T_j=175°C
Diode continuous forward current	I_s		17 14	- -	A	V_{GS}=-4V T_C = 25°C T_C = 100°C
Diode Peak reverse recovery Current	I_{rrm}	-	4.8	-	A	VGS=0V,V_R=400V I_{SD}=5A, dI/dt=1500A/μs
Body Diode Reverse Recovery Time[2]	t_{rr}	-	7	-	ns	
Body Diode Reverse Recovery Charge[2]	Q_{rr}	-	25	-	nC	

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

Typical Performance Characteristics

Fig 1: Output Characteristics Tj=-55 ℃

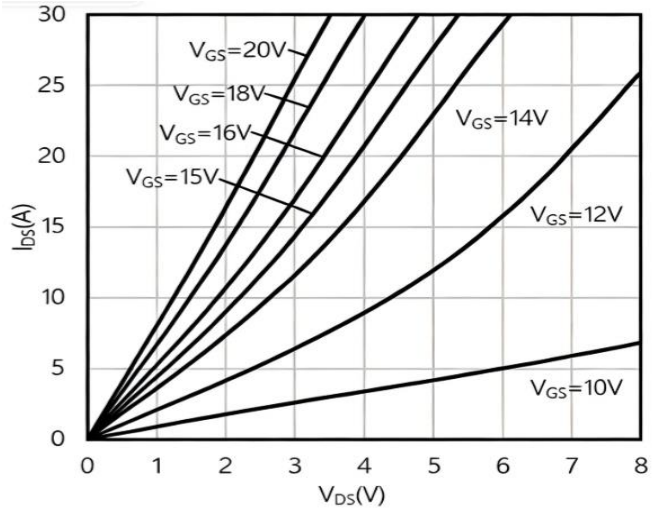


Fig 2: Output Characteristics Tj=25℃

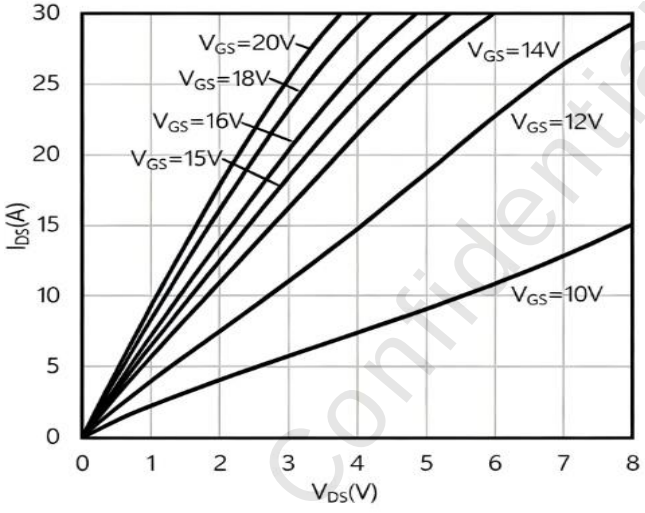


Fig 3: Output Characteristics Tj=175 ℃

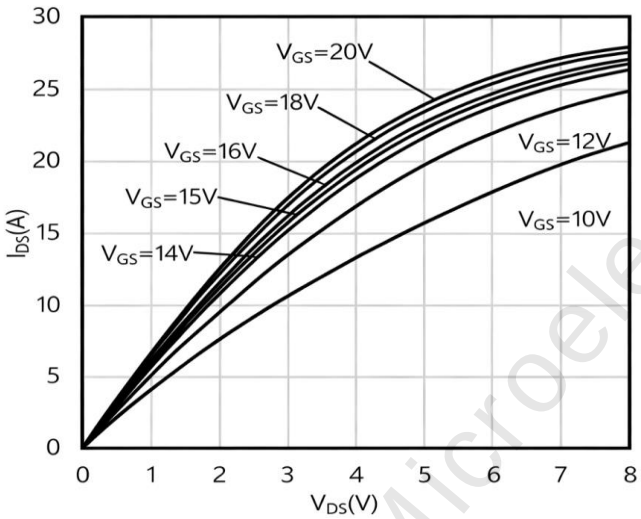


Fig 4: Rds(on) vs Drain Current for various Temperature

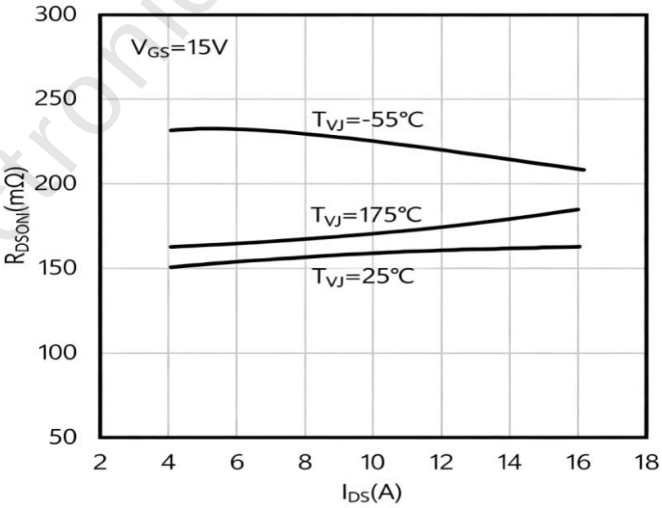


Fig 5: Rds(on) vs. Temperature

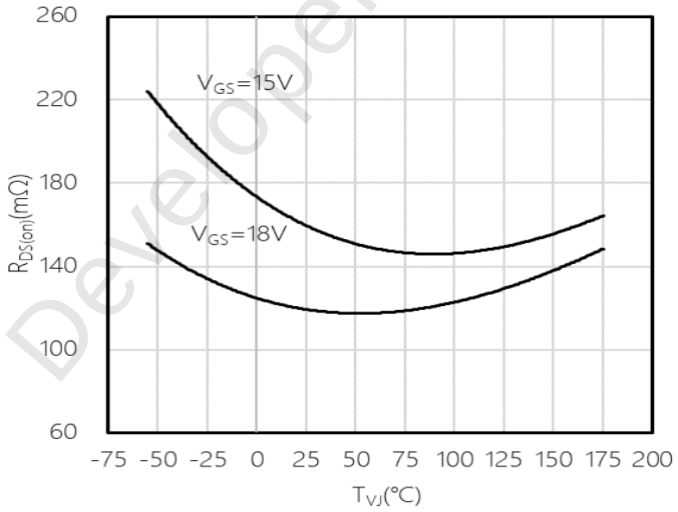
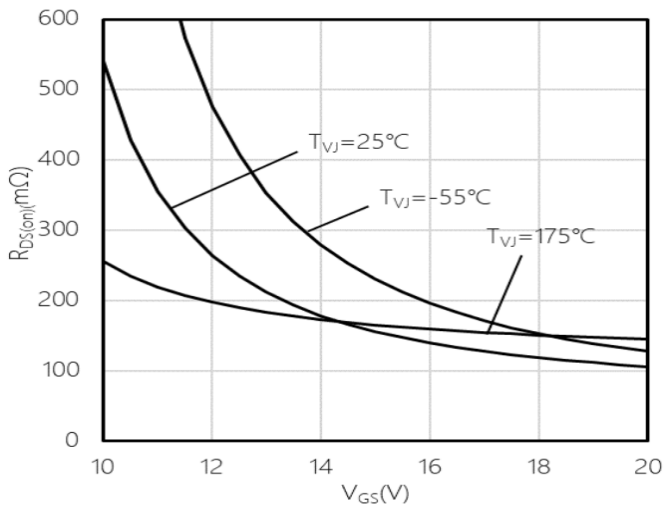


Fig 6: Rds(on) vs. Gate Voltage at Temperature



Typical Performance Characteristics

Fig 7: Transfer Characteristics

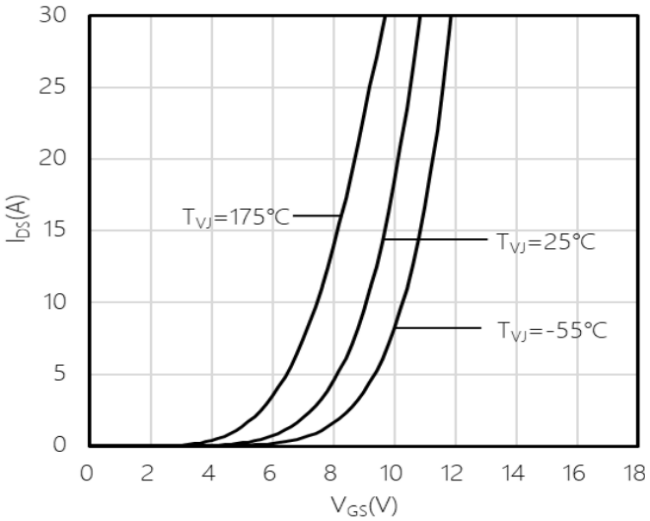


Fig 8: Typical reverse drain current as function of reverse drain voltage. Tvj=-55℃

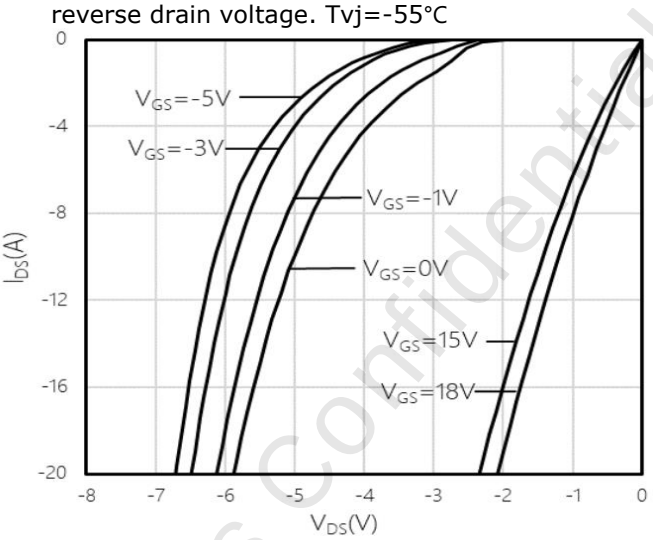


Fig 9: Typical reverse drain current as function of reverse drain voltage. Tvj=25℃

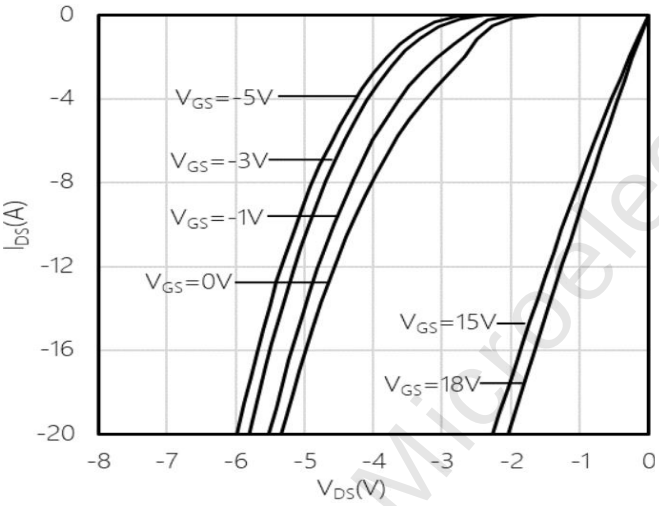


Fig 10: Typical reverse drain current as function of reverse drain voltage. Tvj=175℃

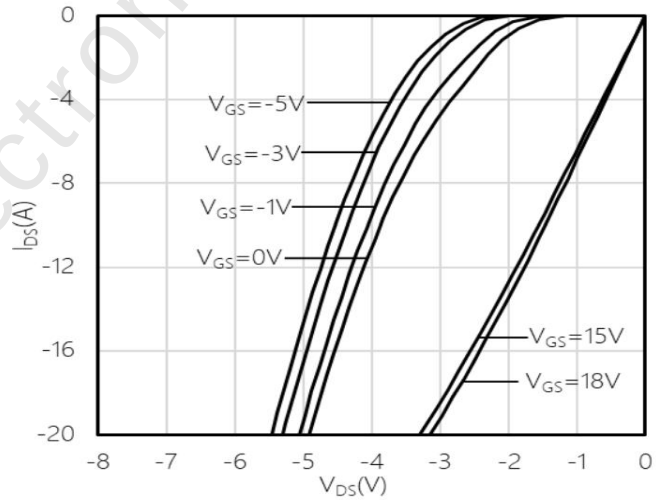


Fig 11: Threshold Voltage vs. Temperature

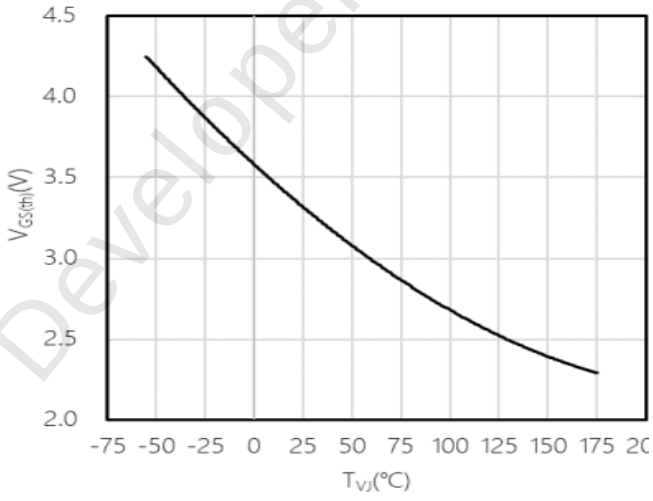


Fig 12: Capacitance Characteristics

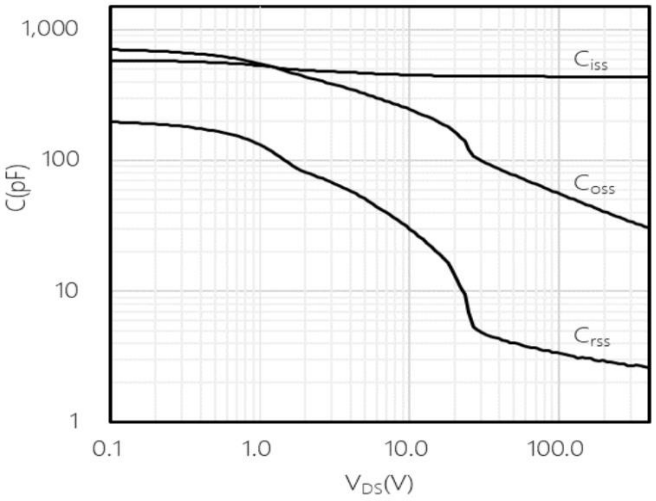


Fig 13: Gate Charge Characteristics

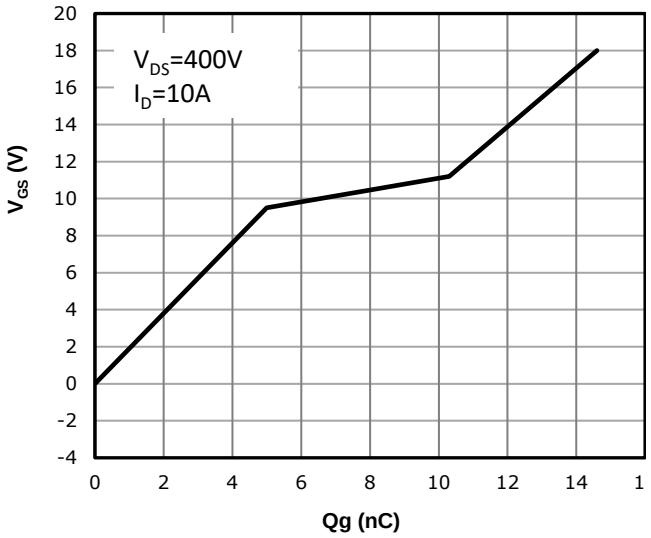


Fig 14: Clamped Inductive Switching energy vs Rg

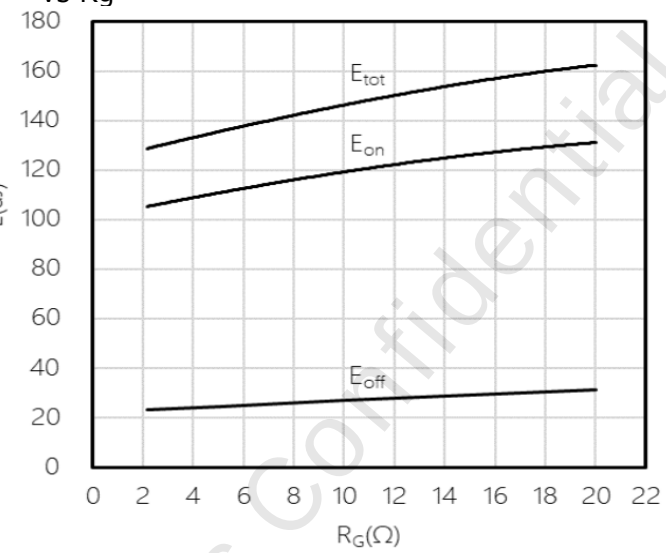


Fig 15: Power Dissipation

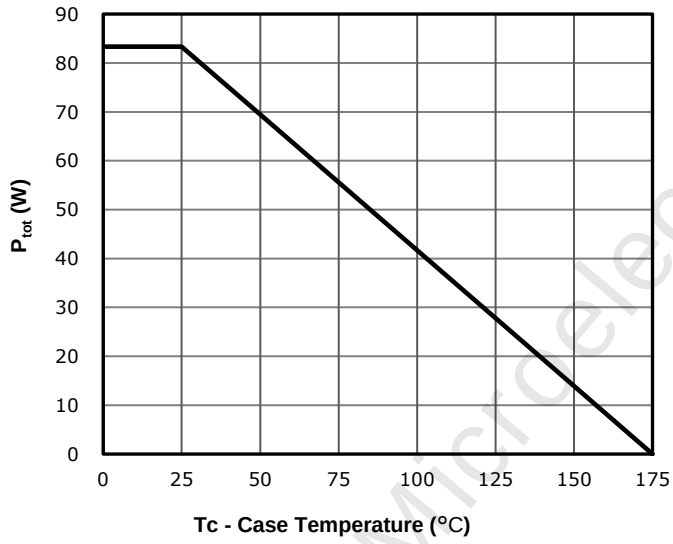


Fig 16: Drain Current Derating

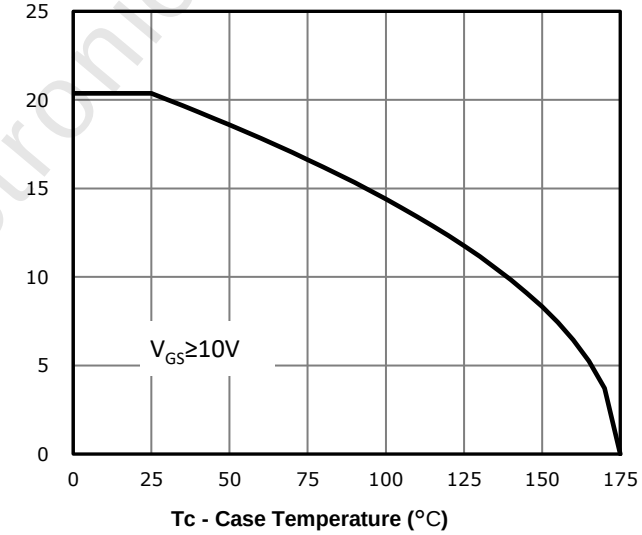


Fig 17: Safe Operating Area

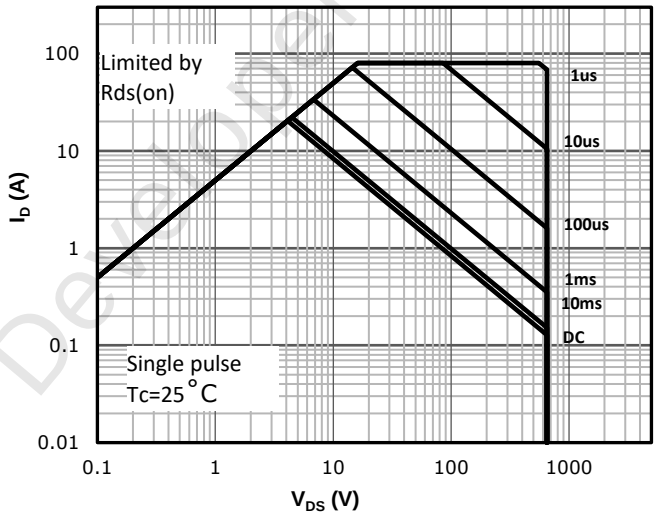
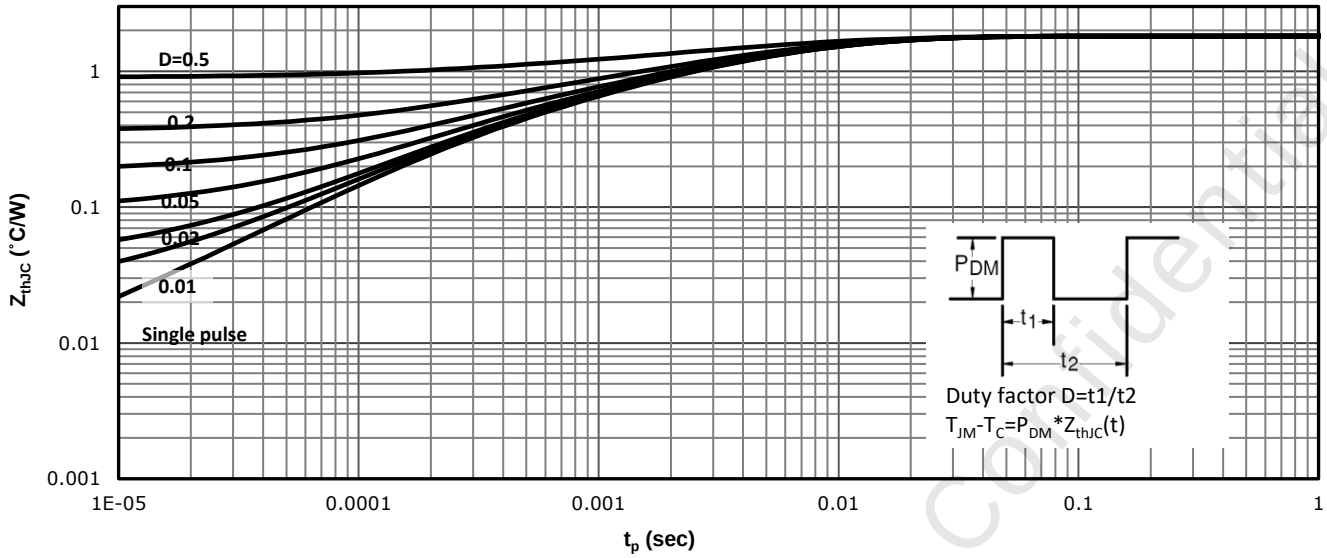
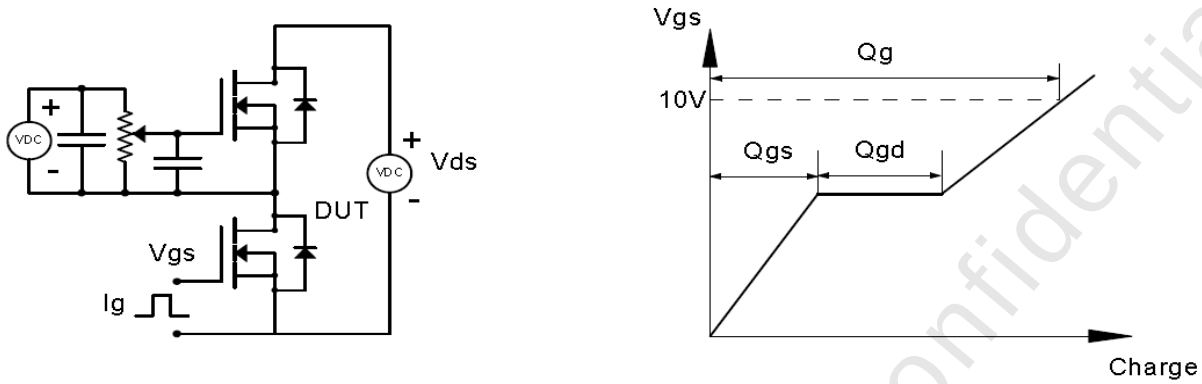


Fig 18: Max. Transient Thermal Impedance

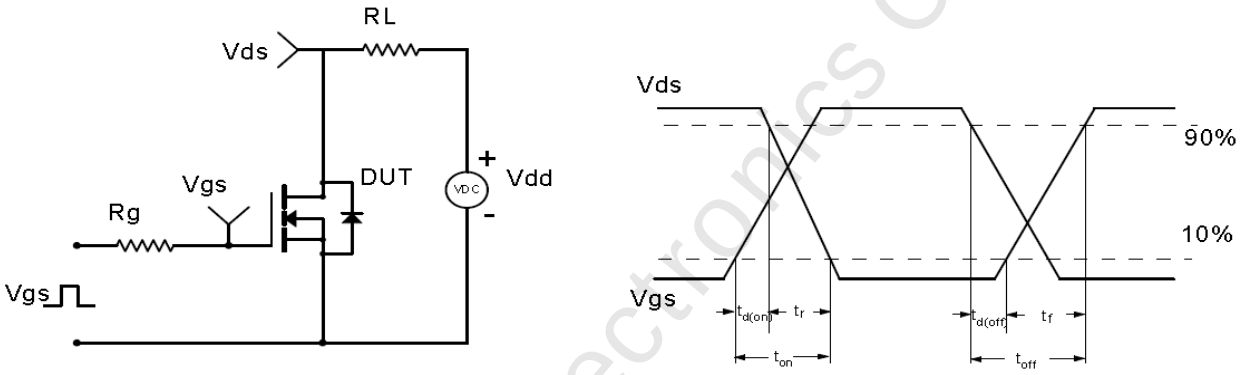


Test Circuit & Waveform

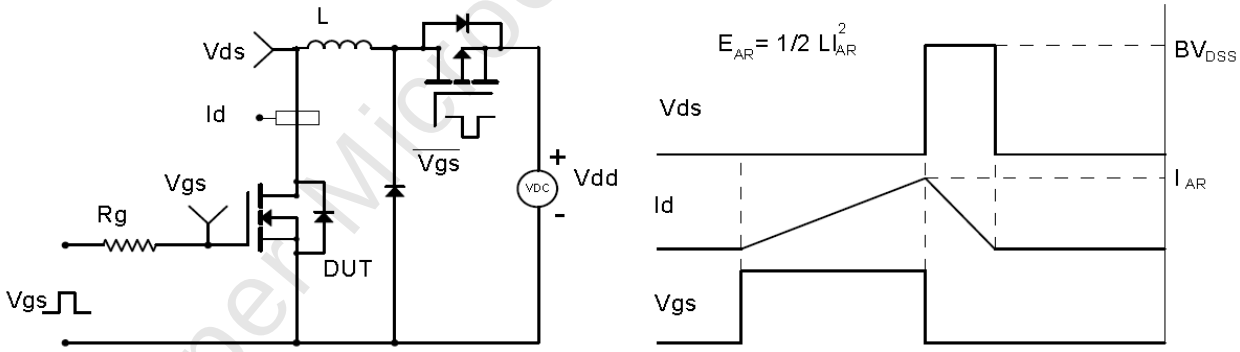
Gate Charge Test Circuit & Waveform



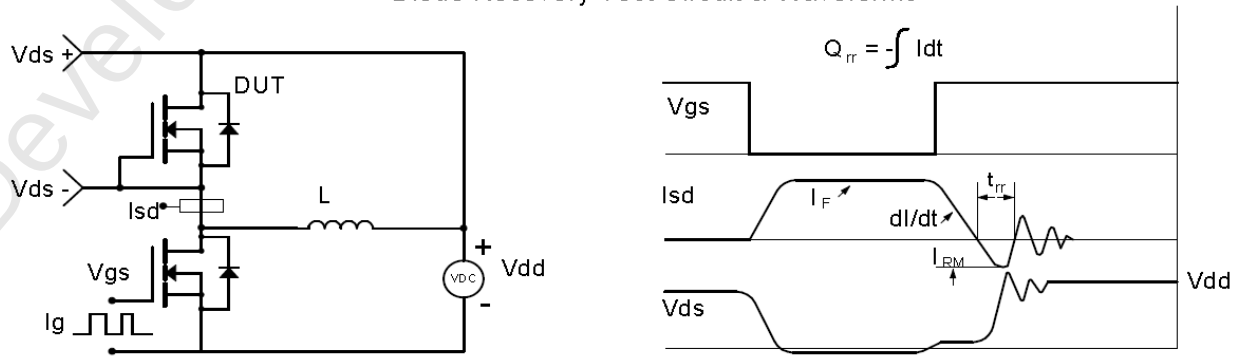
Resistive Switching Test Circuit & Waveforms



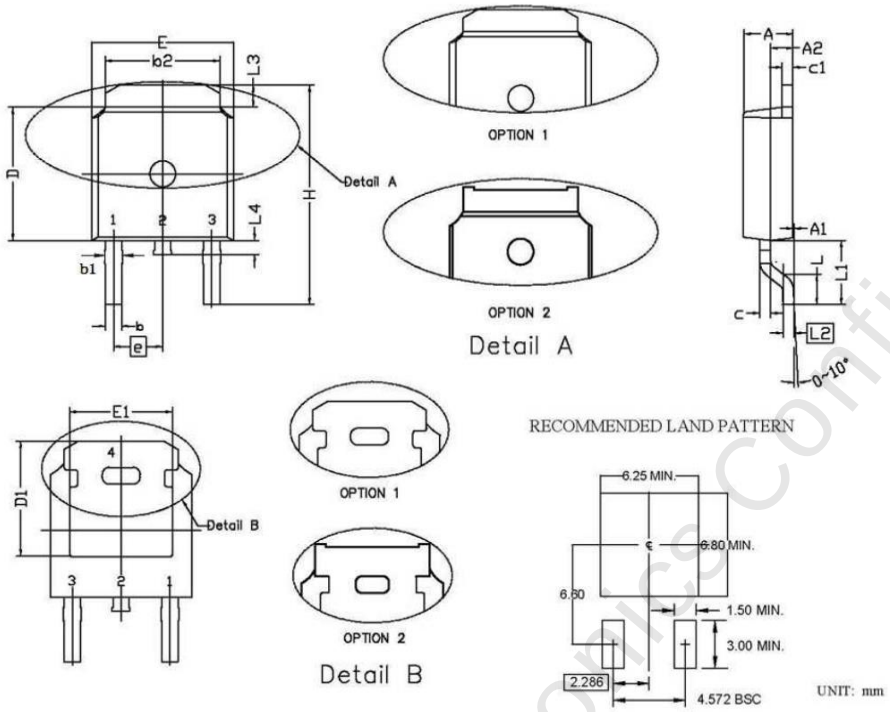
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

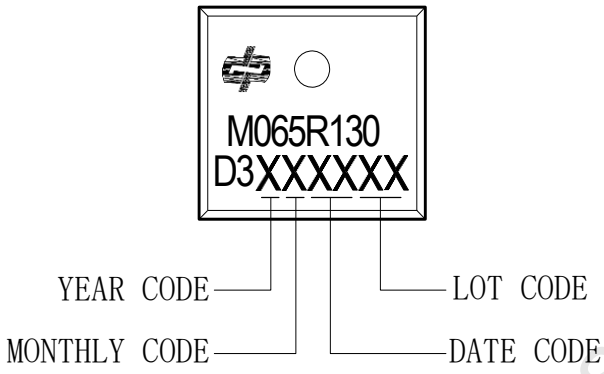


Package Outline: TO252



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

Part Marking Information



Revision History

Revison	Major changes
1.15	Release for formal version1.15

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