DPM080R160A3G2

N-Channel Silicon Carbide MOSFET

Product Summary

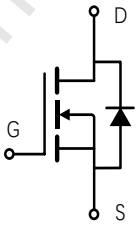
Part #	V_{DS}	$R_{DS(on)}$	I_D (T_{vj}=25℃)
DPM080R160A3G2	800V	158mΩ	13A

TO-220F



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
DPM080R160A3G2	M080R160A3	TO-220F	Tube

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	 13 9	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	52	A
Avalanche energy, single pulse (L=0.5mH, Rg=25)[1]	E_{AS}	23	mJ
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}	36 14	W
Operating junction temperature	T_j	-40...+175	°C
Storage temperature	T_{stg}	-40...+150	°C

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Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – mounting base	R_{thMB}	3.5	°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	$V_{GS(th)}$	2.7	3.4 2.3	4.1	V	V_{DS}=V_{GS},I_D=3.5mA 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	$R_{DS(on)}$	-	158 185	210	mΩ	V_{GS}=18V, I_D=8A T_j=25°C T_j=175°C
		-	208 245	280	mΩ	V_{GS}=15V, I_D=8A T_j=25°C T_j=175°C
Gate resistance	R_g	-	23	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz
Dynamic Characteristic[2]						
Input Capacitance	C_{iss}	-	297	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
Output Capacitance	C_{oss}	-	24	-		
Reverse Transfer Capacitance	C_{rss}	-	2.2	-		
Gate Total Charge	Q_g	-	13	-	nC	V_{GS}=0/15V, V_{DS}=400V, I_D=8A, f=1MHz
Gate-Source charge	Q_{gs}	-	4.5	-		
Gate-Drain charge	Q_{gd}	-	1.5	-		
Turn-on delay time	$t_{d(on)}$	-	6	-	ns	V_{GS}=0/15V, V_{DD}=400V, $R_{G\ ext}$=2.5Ω
Rise time	t_r	-	17	-		
Turn-off delay time	$t_{d(off)}$	-	10	-		

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Fall time	t_f	-	9	-		L=200μH
Turn-On Energy	E_{on}	-	46	-	μJ	
Turn-Off Energy	E_{off}	-	14	-		

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.6 3.2	4.7	V	V_{GS}=0V,I_{SD}=5A T_j=25°C T_j=175°C
Diode continuous forward current	I_s		16 12	- -	A	V_{GS}=0V T_C = 25°C T_C = 100°C
Diode Peak reverse recovery Current	I_{rrm}	-	6	-	A	VGS=0V,V_R=400V I_{SD}=5A, dI/dt=1000A/μs
Body Diode Reverse Recovery Time[2]	t_{rr}	-	10	-	ns	
Body Diode Reverse Recovery Charge[2]	Q_{rr}	-	48	-	μC	

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

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Typical Performance Characteristics

Fig 1: Output Characteristics
Tj=-40 ℃

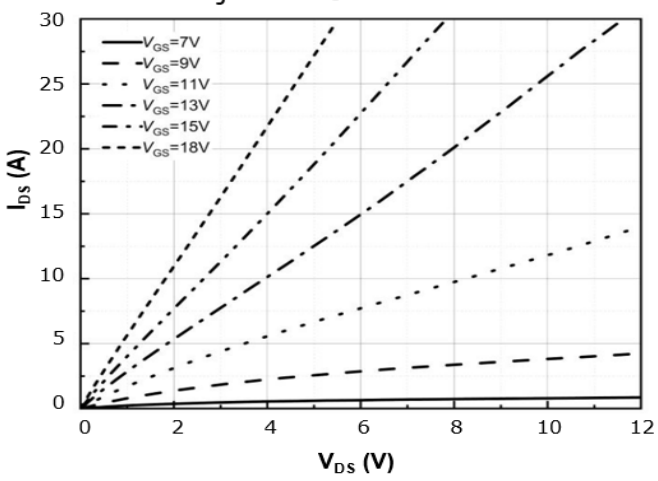


Fig 2: Output Characteristics
Tj=25℃

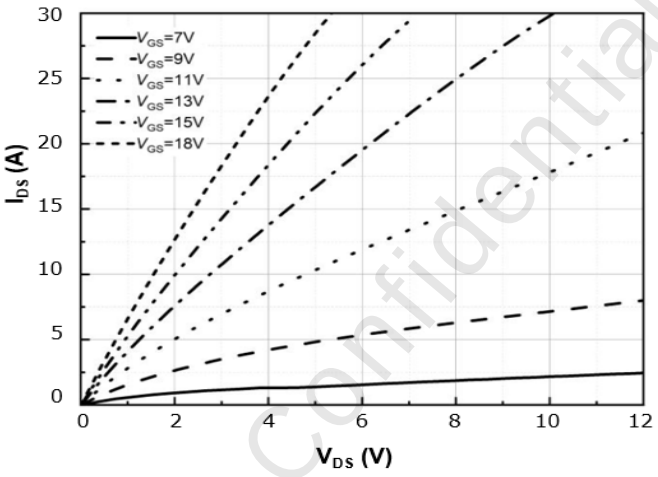


Fig 3: Output Characteristics
Tj=175℃

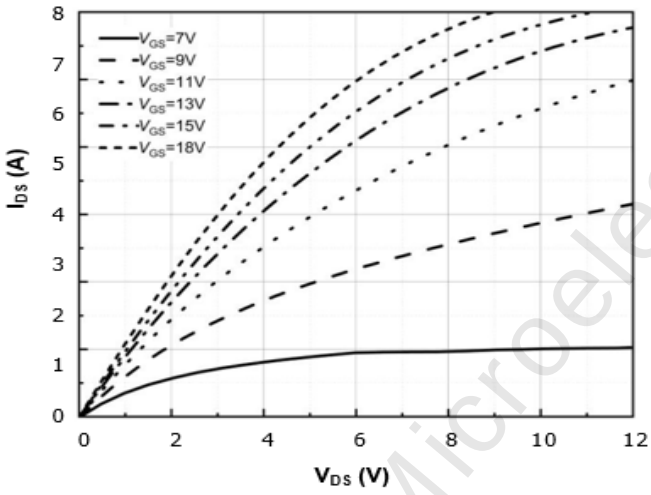


Fig 4: Rds(on) vs Drain Current for various Temperature

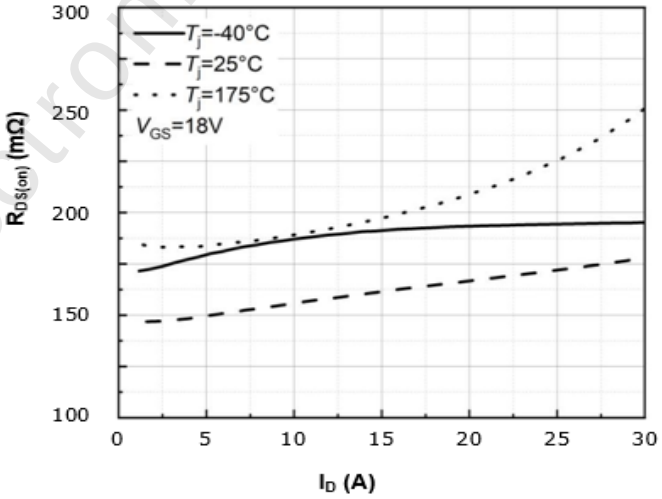


Fig 5: Rds(on) vs. Temperature

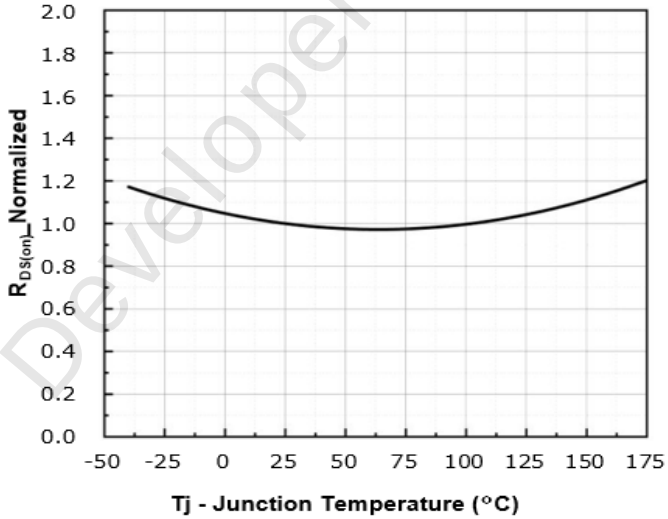
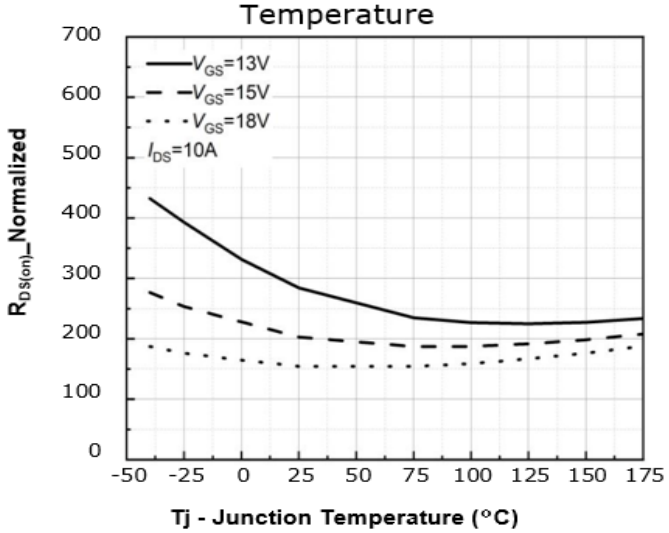


Fig 6: Rds(on) vs. Gate Voltage at Temperature



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Typical Performance Characteristics

Fig 7: Transfer Characteristics

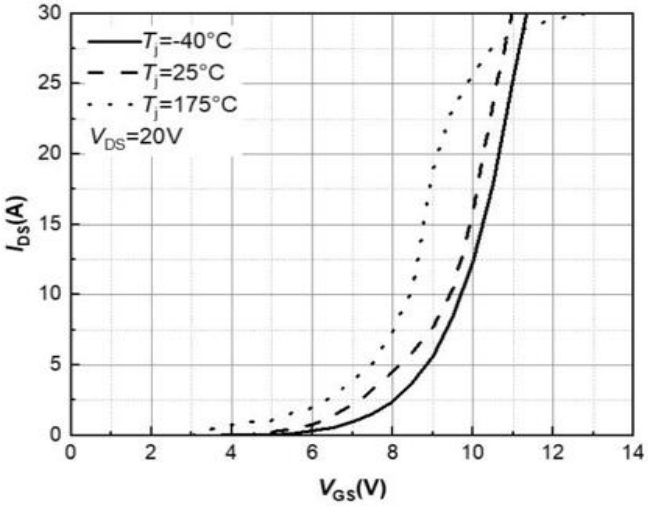


Fig 8: Body Diode Characteristic
Tj=-40℃

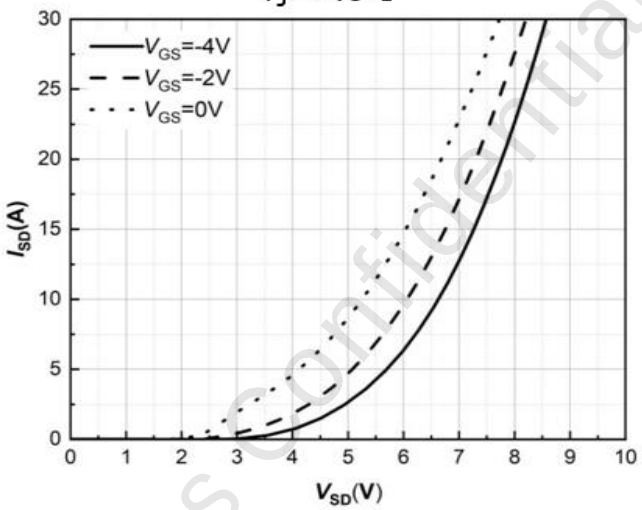


Fig 9: Body Diode Characteristic
Tj=25℃

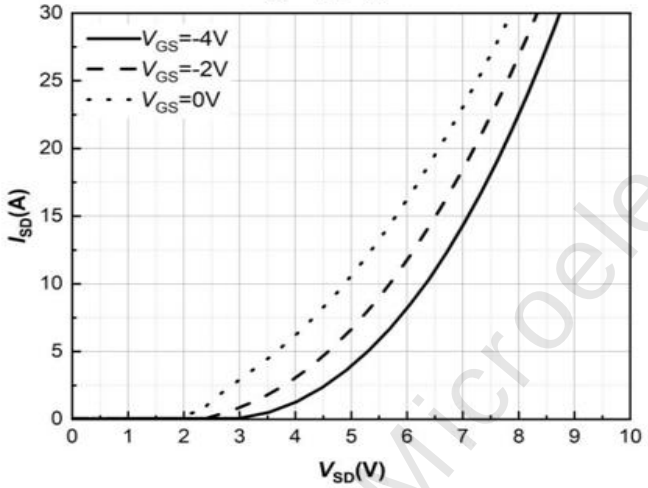


Fig 10: Body Diode Characteristic
Tj=175℃

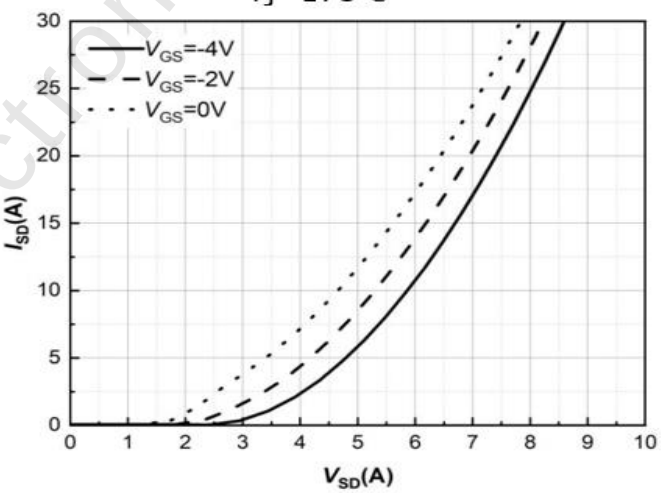


Fig 11: Threshold Voltage vs. Temperature

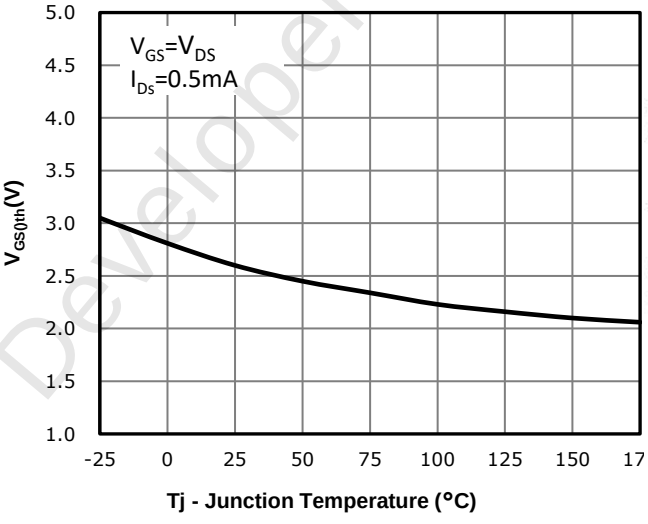
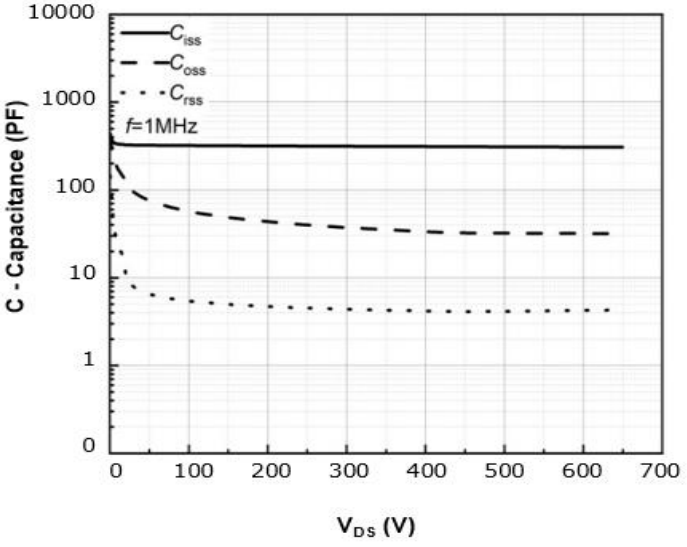


Fig 12: Capacitance Characteristics



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Fig 13: Gate Charge Characteristics

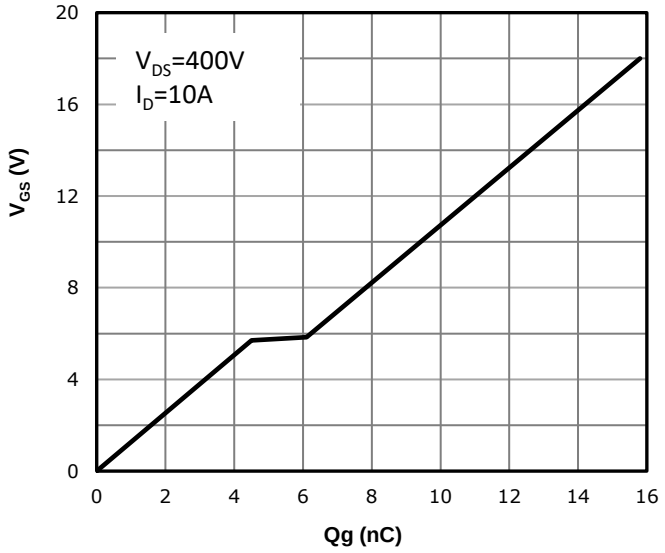


Fig 14: Clamped Inductive Switching energy vs Rg

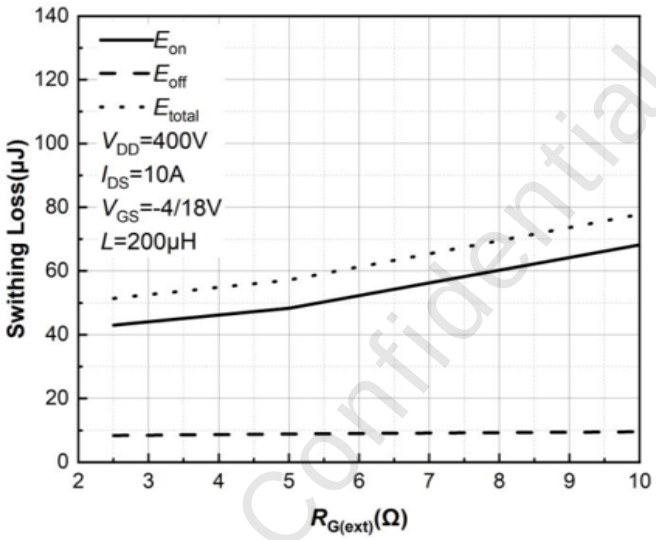


Fig 15: Power Dissipation

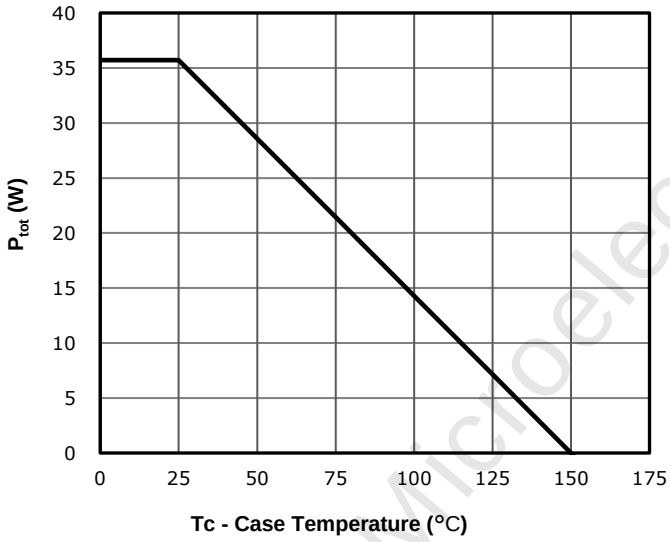


Fig 16: Drain Current Derating

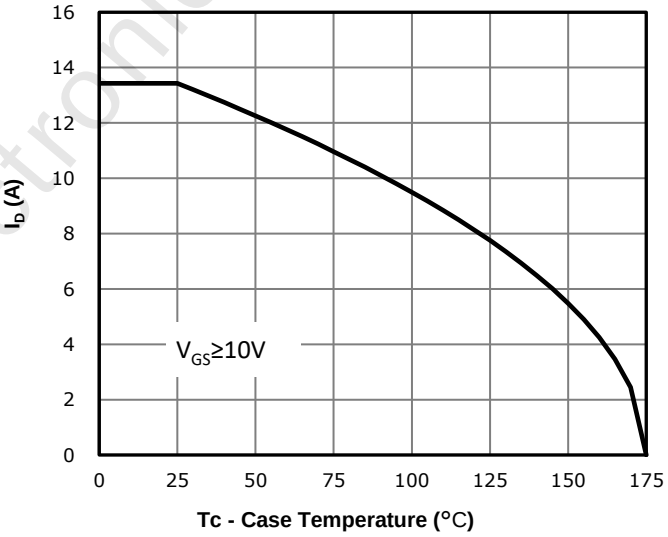
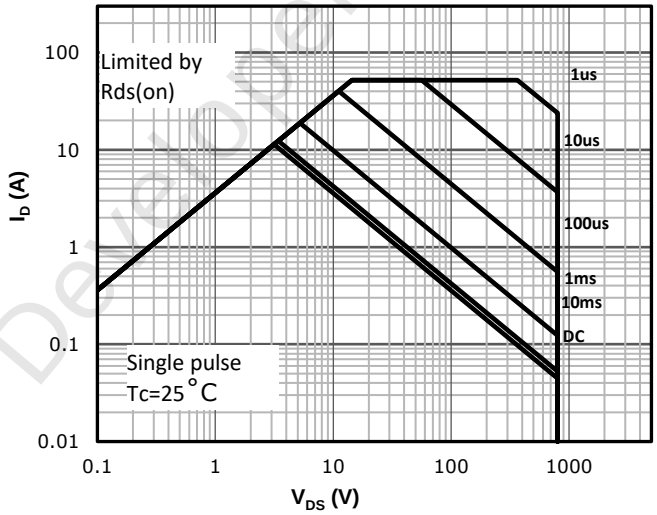
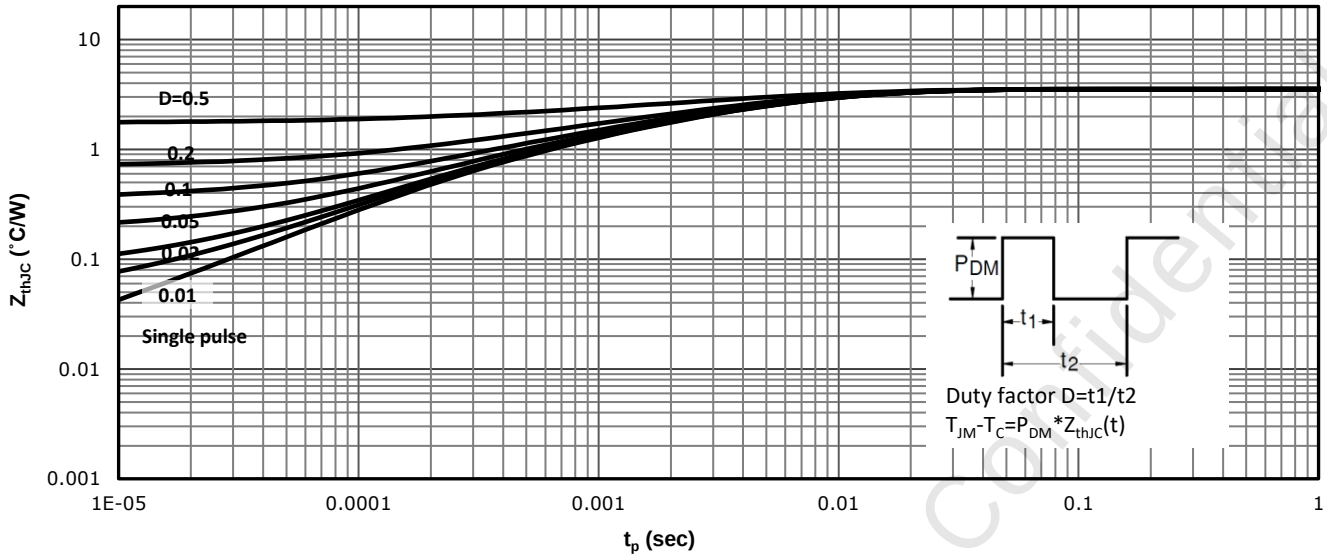


Fig 17: Safe Operating Area



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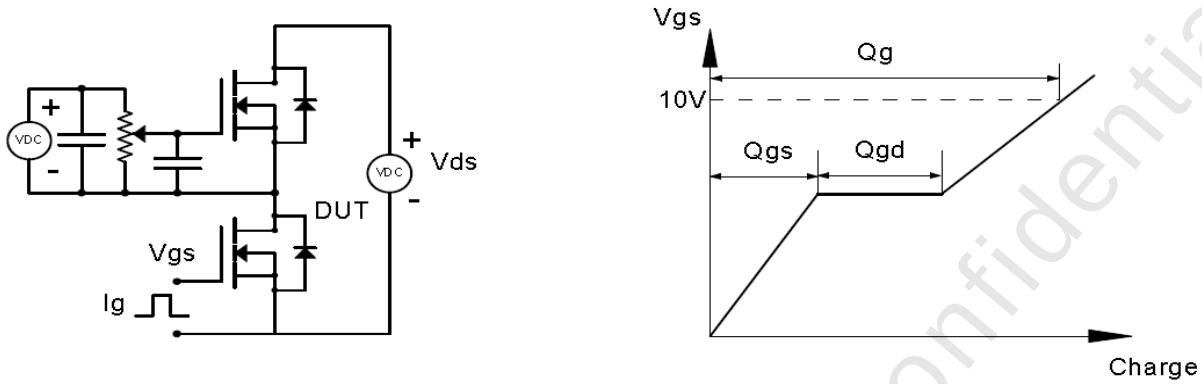
Fig 18: Max. Transient Thermal Impedance



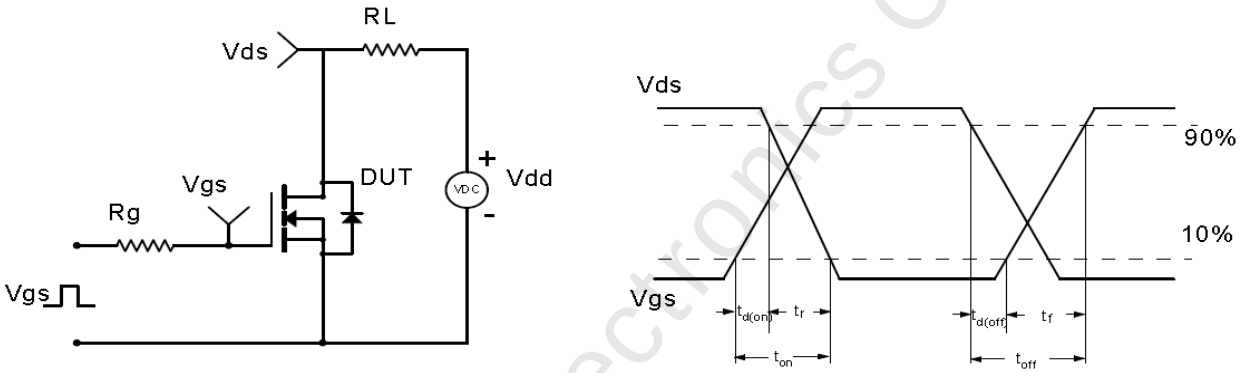
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Test Circuit & Waveform

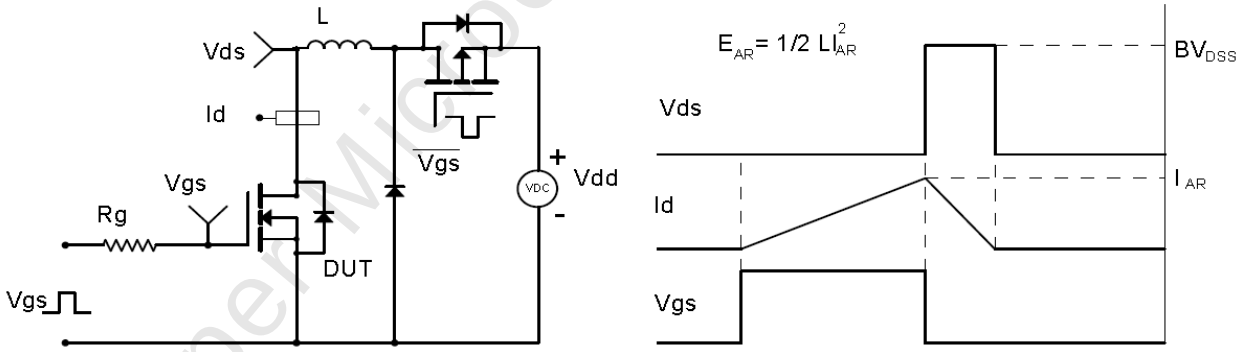
Gate Charge Test Circuit & Waveform



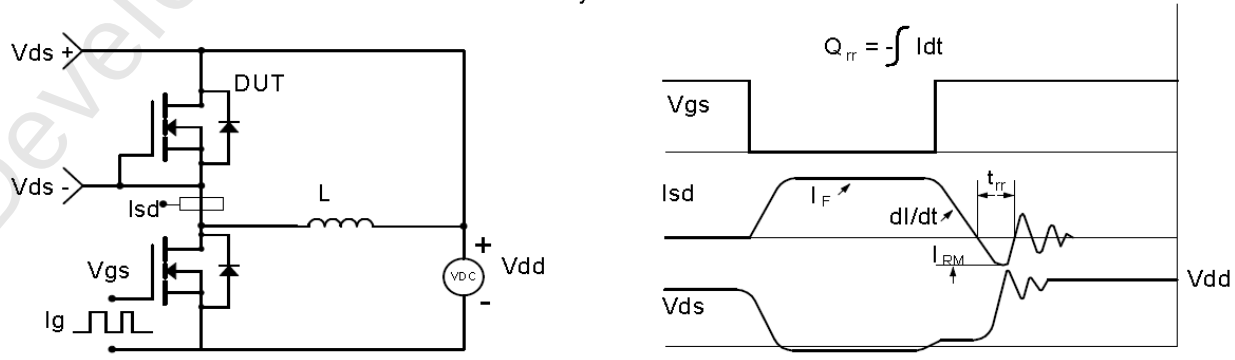
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

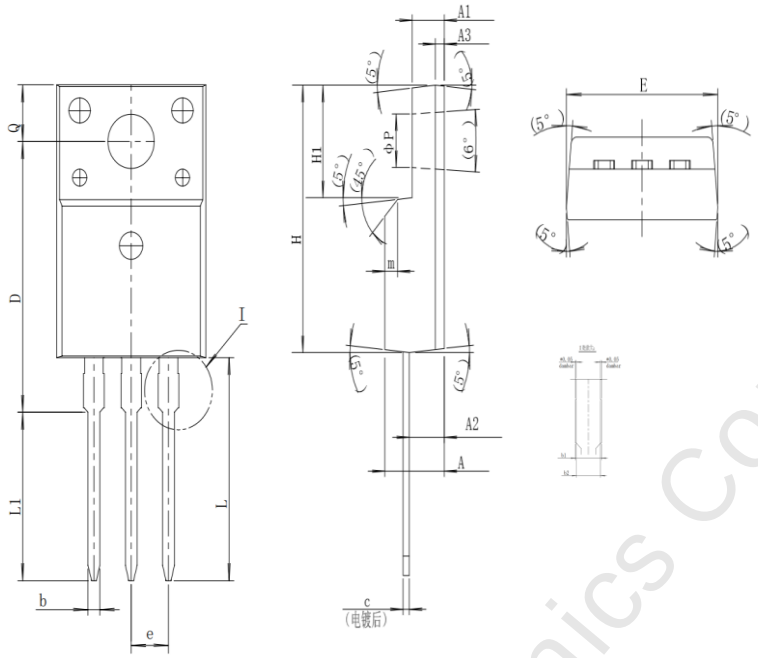


Diode Recovery Test Circuit & Waveforms



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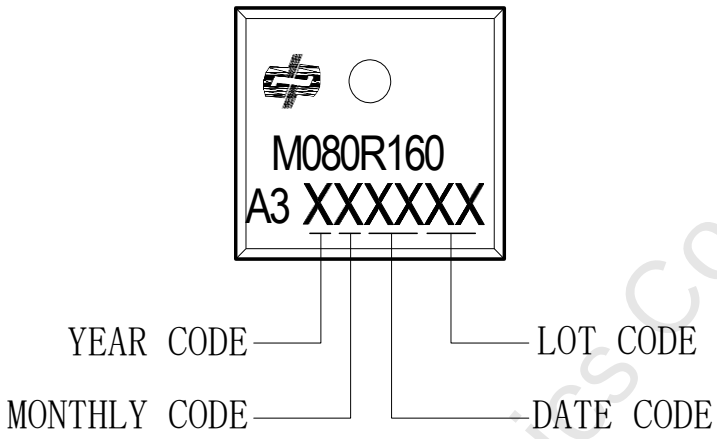
Package Outline: TO-220F



Symbol	Dimensions In Millimeters		
	Min.	NOM	Max.
A	4.60	4.70	4.80
A1	2.44	2.54	2.64
A2	2.65	2.75	2.85
A3		0.7 REF	
b	0.70	0.80	0.90
b1	1.28	1.38	1.47
b2	1.18	1.28	1.39
c	0.45	0.50	0.60
D	15.64	15.75	15.85
E	10.06	10.16	10.26
e		2.54 BSC	
H	15.77	15.87	15.97
H1	6.58	6.68	6.78
L	12.68	12.98	13.28
L1	9.60	9.80	10.00
Q	3.20	3.30	3.40
ΦP	3.08	3.18	3.28
m	0.50	1.00	1.50

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Part Marking Information



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Revision History

Revison	Major changes
1.05	Release for formal version1.05

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