

Product Summary

Part #	V_{DS}	$R_{DS(on)}$	I_D ($T_{vj}=25^{\circ}C$)
DPM065R160A3G1	800V	175m Ω	20A

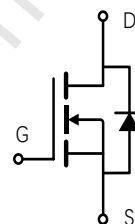
Features

- 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

TO-220F



Package Marking and Ordering Information

Part #	Marking	Package	Packing
DPM065R160A3G1	M065R160A3	TO-220F	Tape/Reel



Halogen-Free

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	800	V
Continuous drain current $T_C = 25^{\circ}C$ $T_C = 100^{\circ}C$	I_D	20 15	A
Pulsed drain current ($T_C = 25^{\circ}C$, t_p limited by T_{jmax})	$I_{D\ pulse}$	80	A
Gate-source voltage, max. transient voltage	V_{GSmax}	-8/+22	V
Gate-source voltage, max. static voltage	V_{GSop}	-4/+18	V
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^{\circ}C$) Power dissipation ($T_C = 100^{\circ}C$)	P_{tot}	28 11	W
Operating junction temperature	T_j	-40...+175	$^{\circ}C$
Storage temperature	T_{stg}	-40...+150	$^{\circ}C$

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case. Max	R_{thMB}	4.5	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	65	

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

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

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	800	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2	2.7 2.0	4	V	$V_{DS}=V_{GS}, I_D=2.5mA$ $T_j=25^{\circ}\text{C}$ $T_j=175^{\circ}\text{C}$
Zero gate voltage drain current	I_{DSS}	-	1	10	μA	$V_{DS}=650V, V_{GS}=0V$ $T_j=25^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	-	250	nA	$V_{GS}=18V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	175 188	220	m Ω	$V_{GS}=18V, I_D=10A$ $T_j=25^{\circ}\text{C}$ $T_j=175^{\circ}\text{C}$
Gate resistance	R_g	-	4	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$

Dynamic Characteristic^[2]

Input Capacitance	C_{iss}	-	310	-	pF	$V_{GS}=0V, V_{DS}=600V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	32	-		
Reverse Transfer Capacitance	C_{rss}	-	4.4	-		
Gate Total Charge	Q_g	-	16	-	nC	$V_{GS}=-4/18V, V_{DS}=400V,$ $I_D=10A, f=1MHz$
Gate-Source charge	Q_{gs}	-	3	-		
Gate-Drain charge	Q_{gd}	-	4.2	-		
Turn-on delay time	$t_{d(on)}$	-	5	-	ns	$V_{GS}=-4/18V, V_{DD}=400V,$ $R_{G_ext}=2.5\Omega$ $L=200\mu H$
Rise time	t_r	-	14	-		
Turn-off delay time	$t_{d(off)}$	-	9	-		
Fall time	t_f	-	5	-		
Turn-On Energy	E_{on}	-	46	-	μJ	
Turn-Off Energy	E_{off}	-	8	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	4.2 3.9	5.5	V	$V_{GS} = -4V, I_{SD} = 5A$ $T_j = 25^{\circ}C$ $T_j = 175^{\circ}C$
Diode continuous forward current	I_s		17 15	- -	A	$V_{GS} = -4V$ $T_C = 25^{\circ}C$ $T_C = 100^{\circ}C$
Diode Peak reverse recovery Current	I_{rrm}	-	6.5	-	A	
Body Diode Reverse Recovery Time ^[2]	t_{rr}	-	9	-	ns	$V_{GS} = -4V, V_R = 400V$ $I_{SD} = 5A, dI/dt = 1000A/\mu s$
Body Diode Reverse Recovery Charge ^[2]	Q_{rr}	-	33	-	μC	

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

Typical Performance Characteristics

Fig 1: Output Characteristics

$T_j = -40^\circ\text{C}$

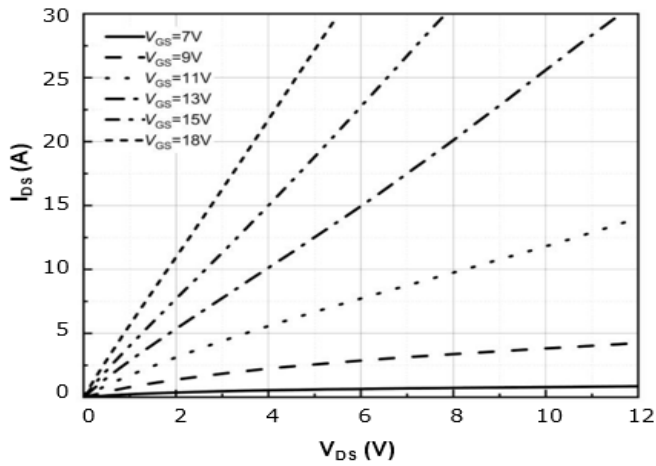


Fig 2: Output Characteristics

$T_j = 25^\circ\text{C}$

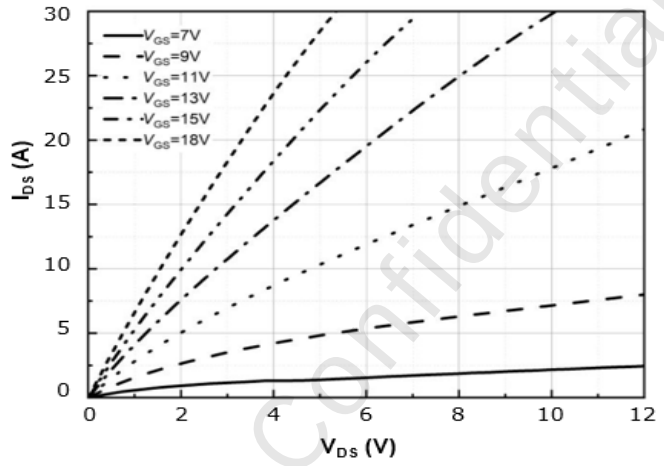


Fig 3: Output Characteristics

$T_j = 175^\circ\text{C}$

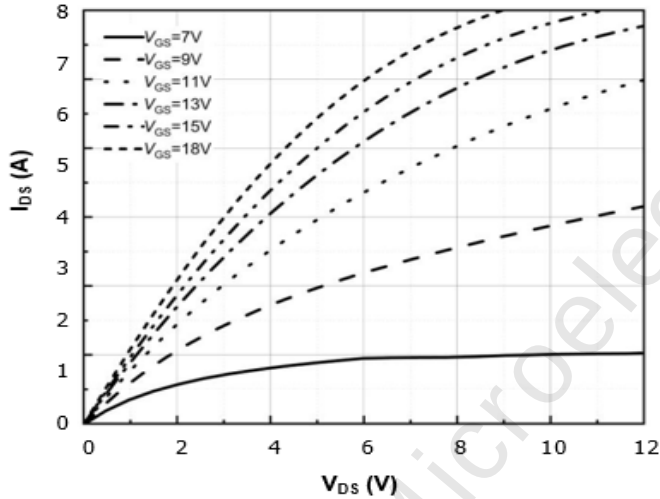


Fig 4: $R_{DS(on)}$ vs Drain Current for various Temperature

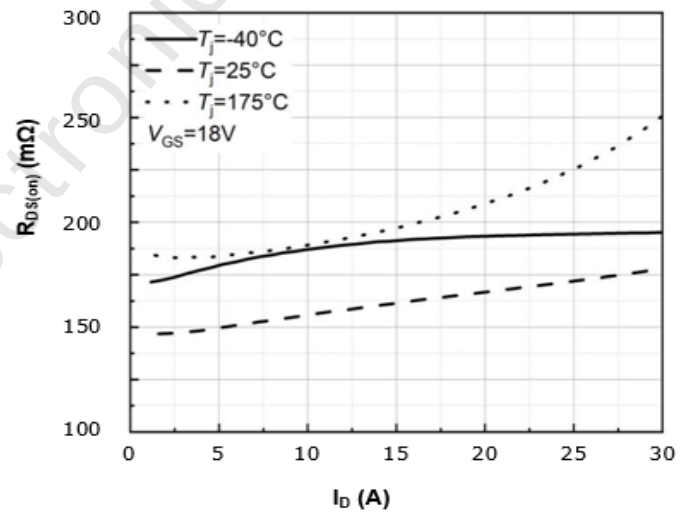


Fig 5: $R_{DS(on)}$ vs. Temperature

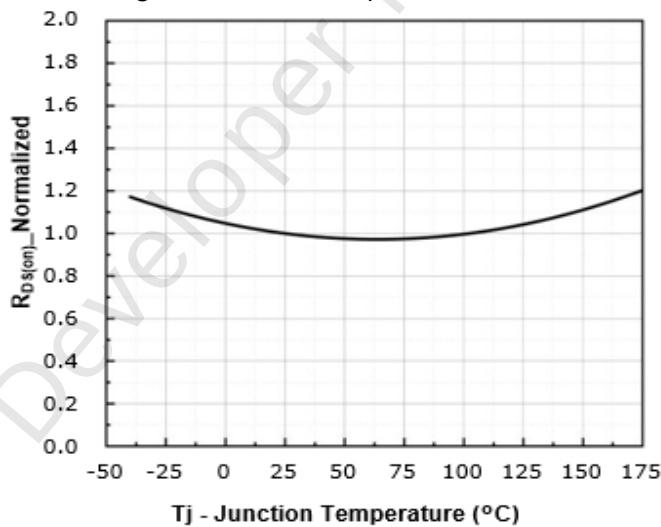
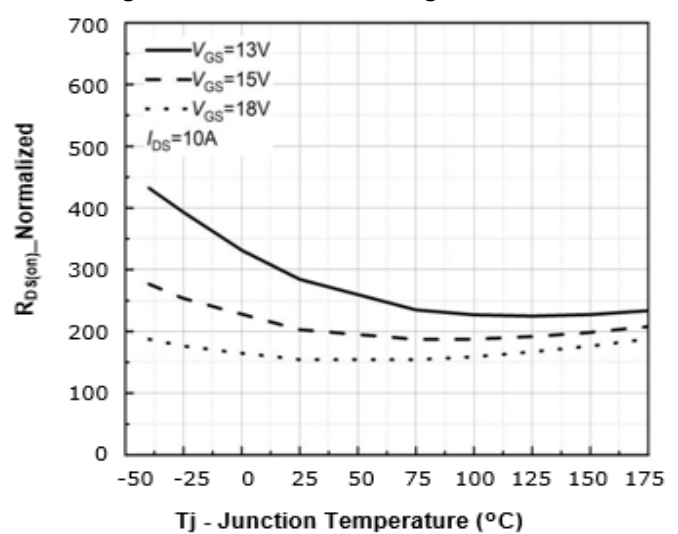


Fig 7: $R_{DS(on)}$ vs. Gate Voltage at



Typical Performance Characteristics

Fig 7: Transfer Characteristics

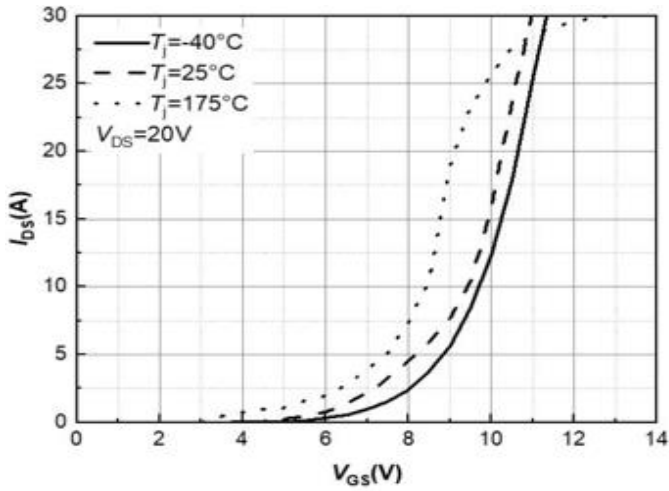


Fig 8: Body Diode Characteristic $T_j = -40^\circ\text{C}$

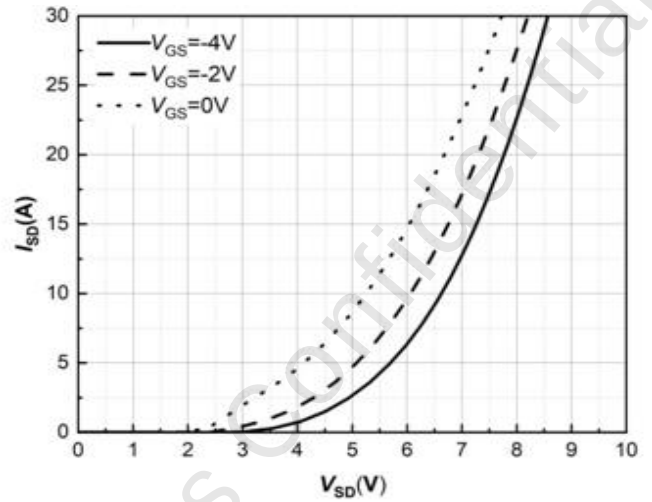


Fig 9: Body Diode Characteristic $T_j = 25^\circ\text{C}$

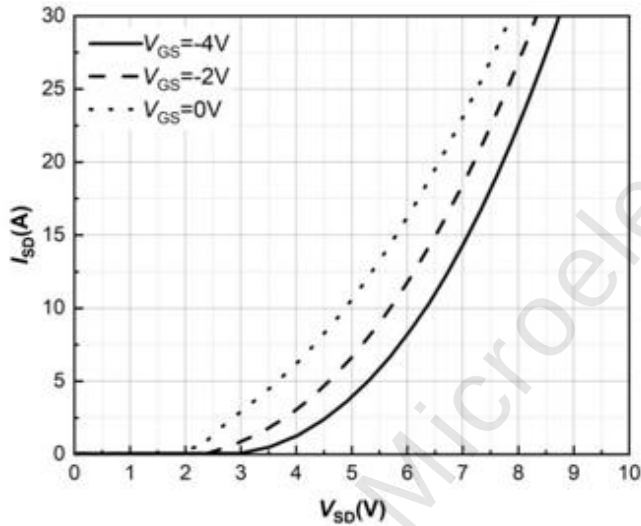


Fig 10: Body Diode Characteristic $T_j = 175^\circ\text{C}$

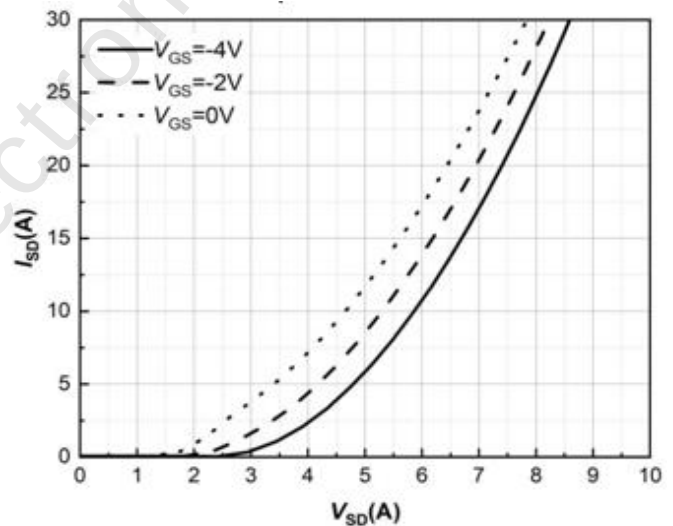


Fig 11: Threshold Voltage vs. Temperature

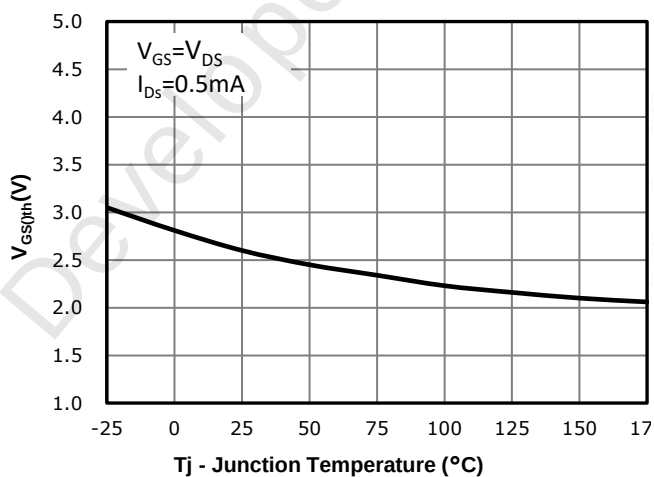


Fig 12: Capacitance Characteristics

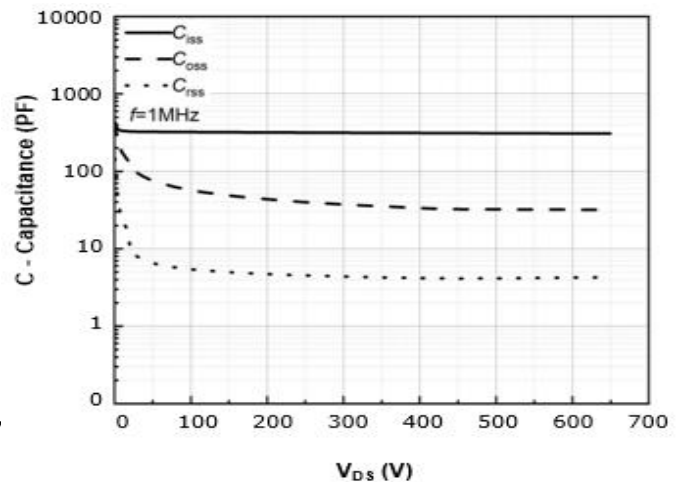


Fig 13: Gate Charge Characteristics

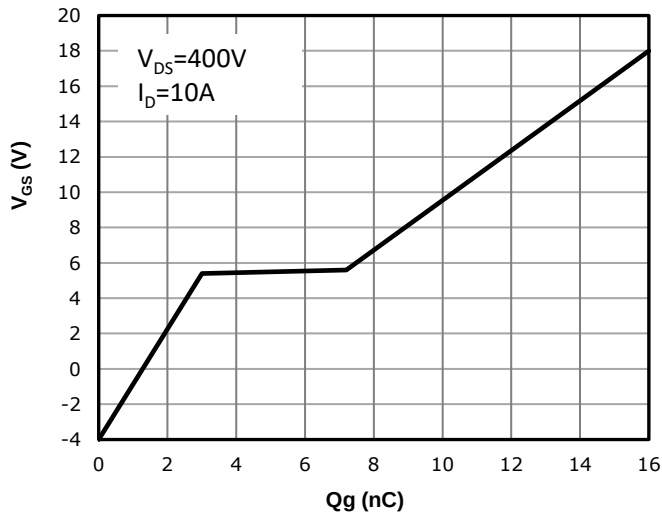


Fig 14: Clamped Inductive Switching energy vs R_g

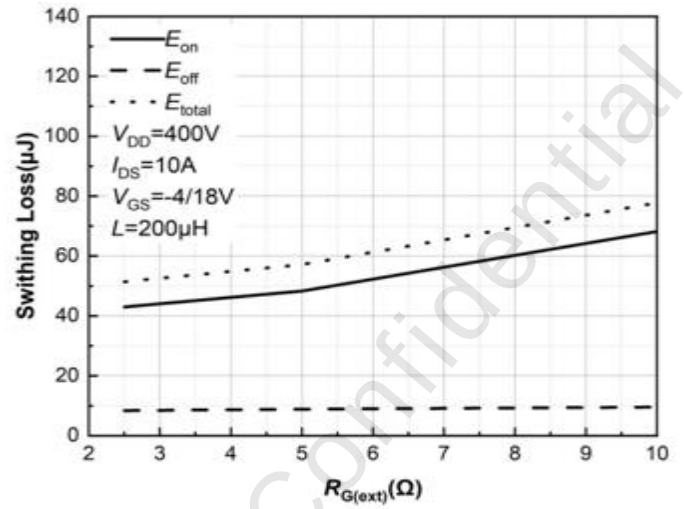


Fig 15: Power Dissipation

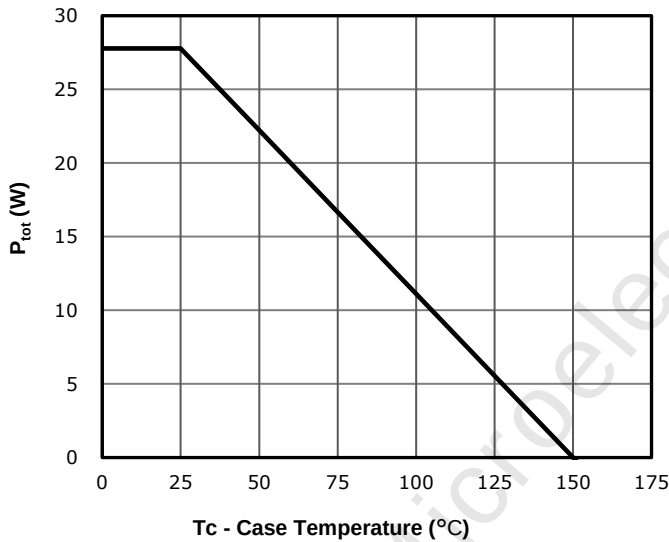


Fig 16: Drain Current Derating

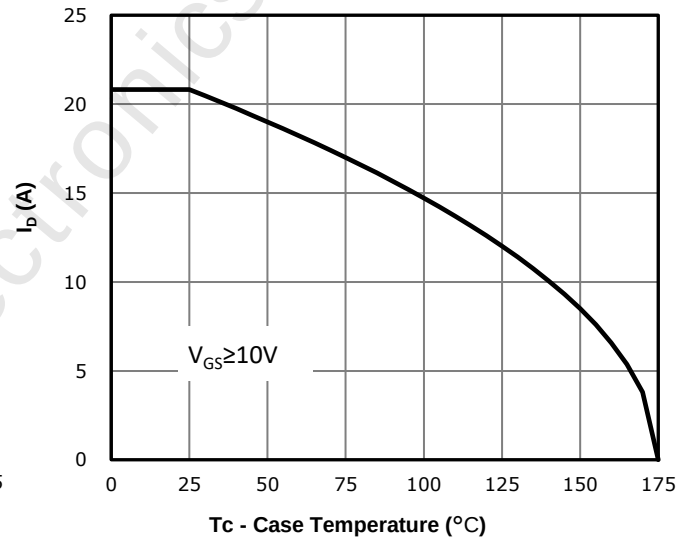


Fig 17: Safe Operating Area

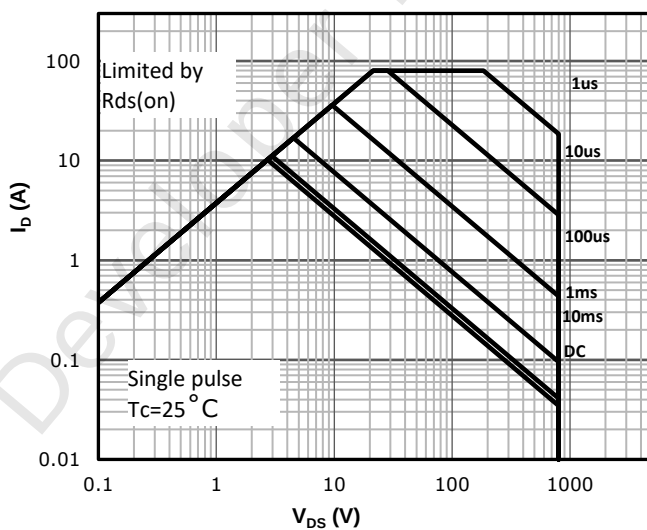
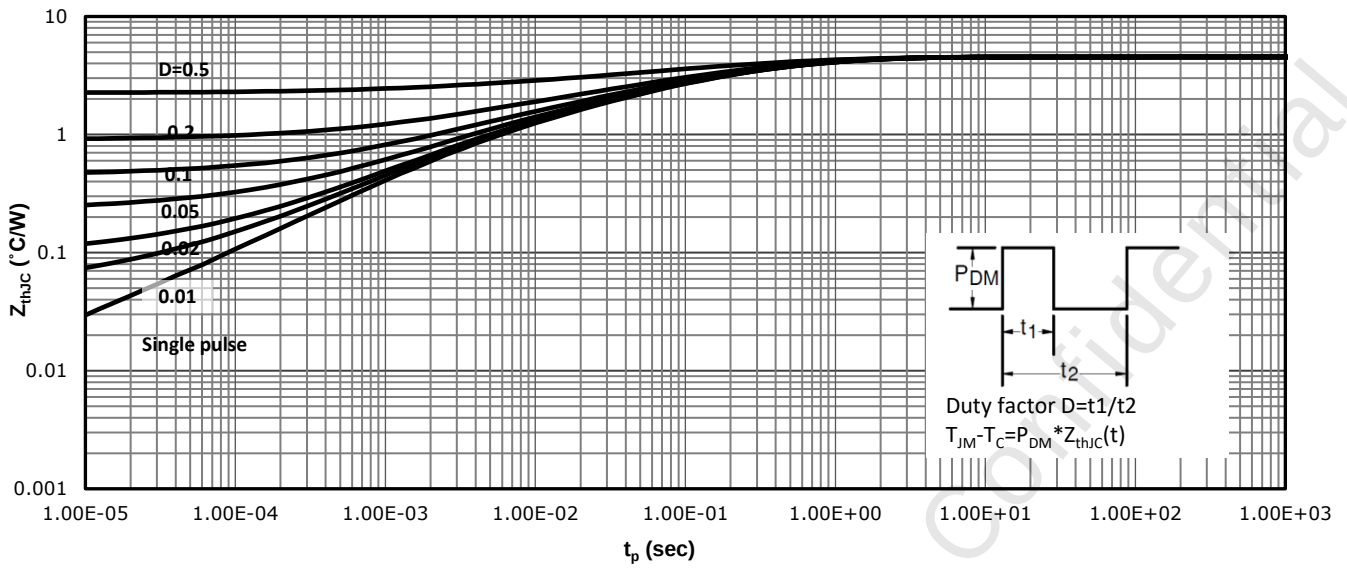
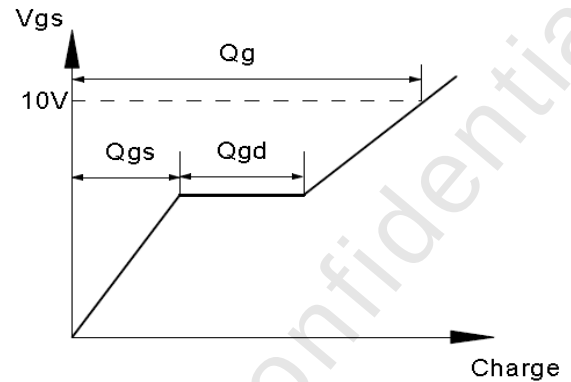
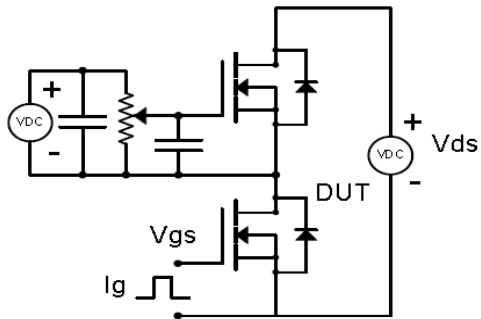


Fig 18: Max. Transient Thermal Impedance

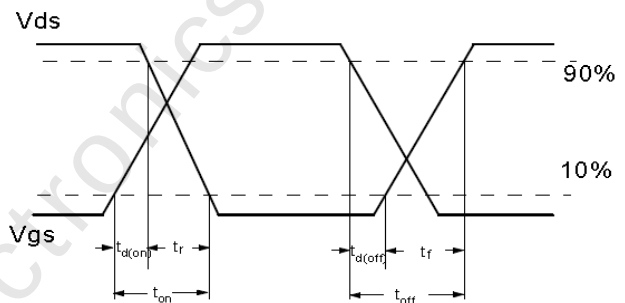
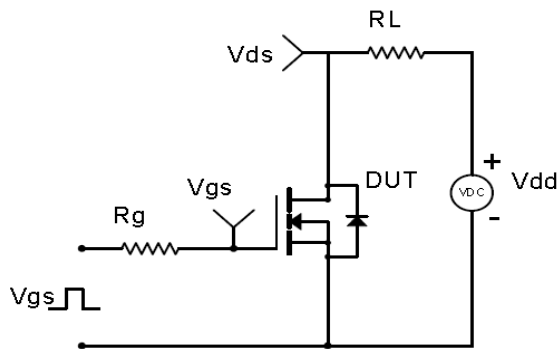


Test Circuit & Waveform

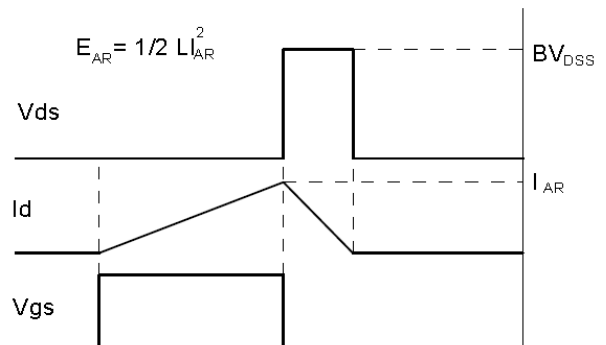
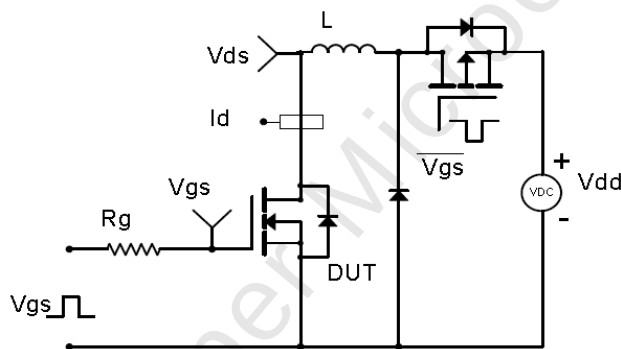
Gate Charge Test Circuit & Waveform



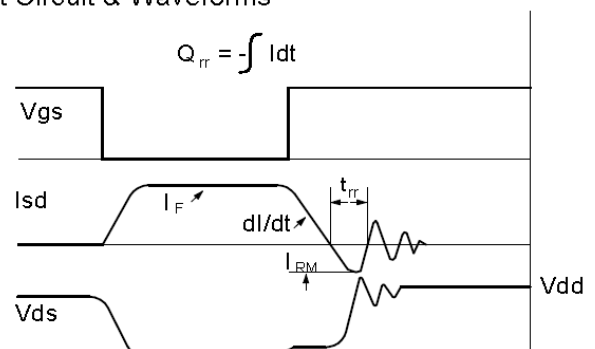
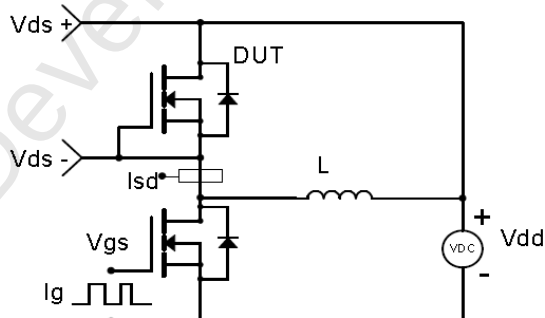
Resistive Switching Test Circuit & Waveforms



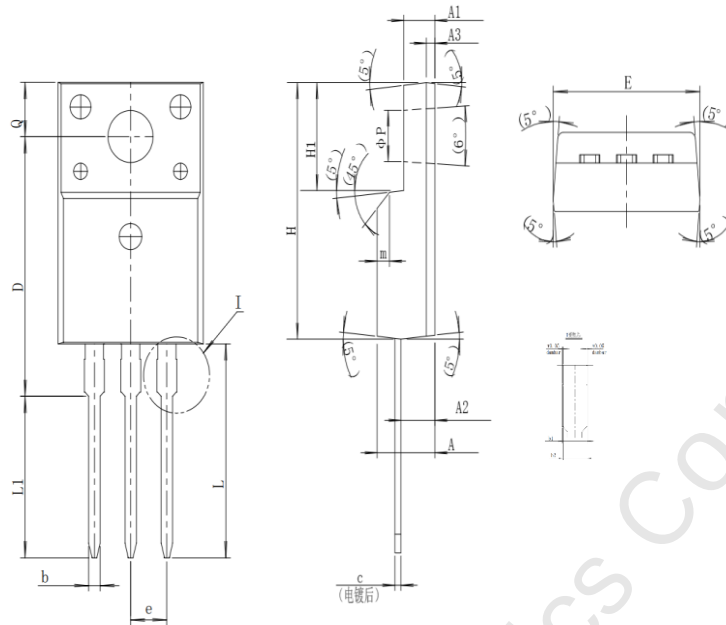
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

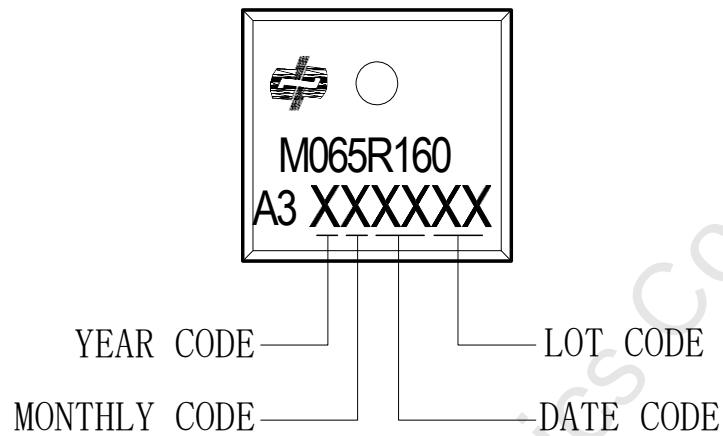


Package Outline: TO-220F



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

Part Marking Information



Revision History

Revision	Major changes
1.1	Release for formal version

重要声明Important Notice

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