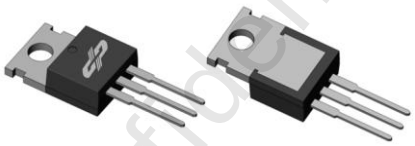
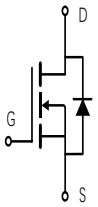
Product Summary

Part #	V_{DS}	$R_{DS(on)}$	I_D (T_{vj}=25℃)
DPM065R130A3G2	650V	128mΩ	23A
DPM065R130P3G2			

TO-220F

TO-220





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
DPM065R130A3G2	M065R130A3	TO-220F	Tube
DPM065R130P3G2	M065R130P3	TO-220	Tube

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	 23 16	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	92	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	TO-220F	TO-220	Unit
Thermal resistance, junction – mounting base	R_{thMB}	3.5	0.6	°C/W
Thermal resistance, junction – ambient	R_{thJA}	80	80	

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	$R_{DS(on)}$	-	158 164	208	mΩ	V_{GS}=15V, I_D=10A T_j=25°C T_j=175°C
		-	128 135	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 16	- -	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	-	μC	

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

Typical Performance Characteristics

Fig 1: Output Characteristics Tj=-55 ℃

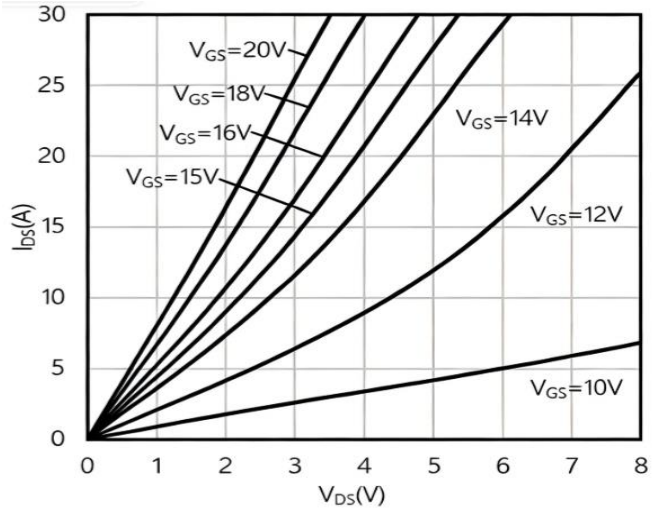


Fig 2: Output Characteristics Tj=25℃

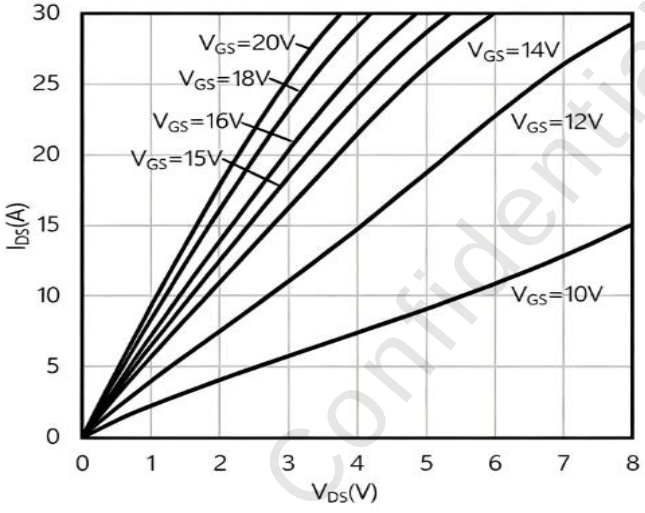


Fig 3: Output Characteristics Tj=175 ℃

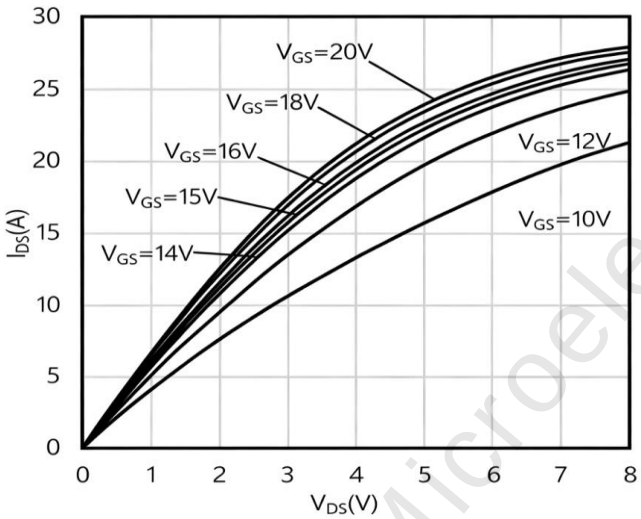


Fig 4: Rds(on) vs Drain Current for various Temperature

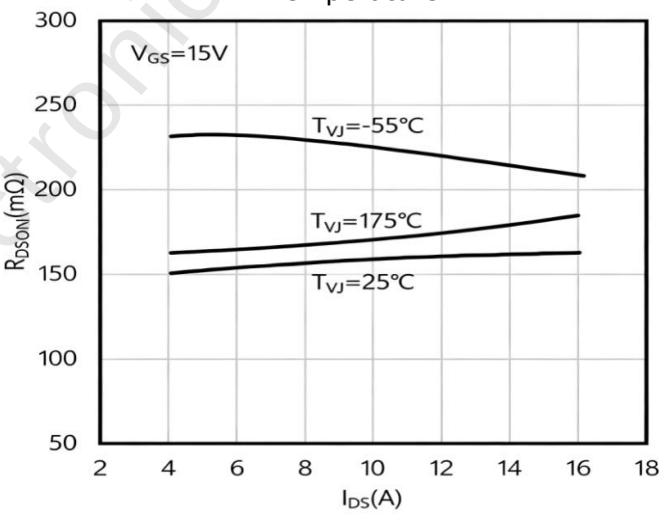


Fig 5: Rds(on) vs. Temperature

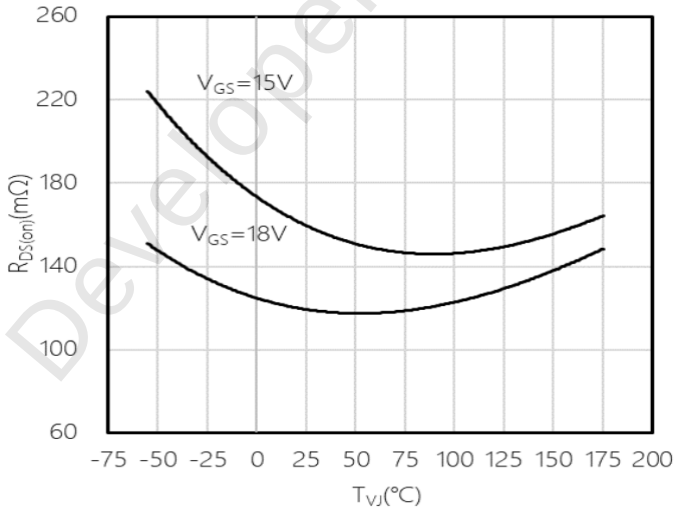
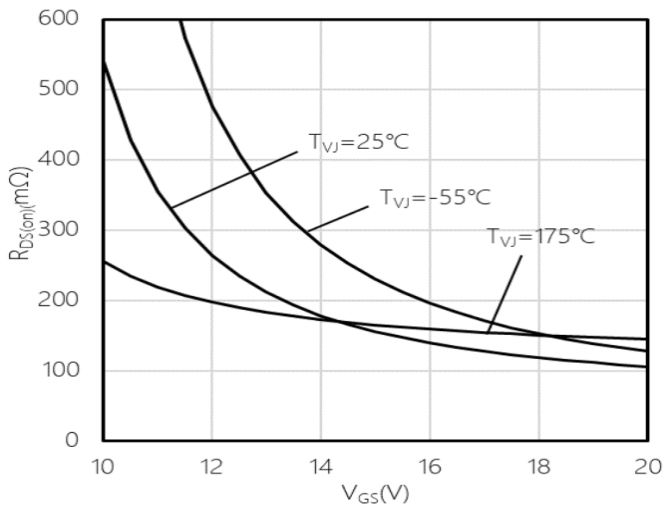


Fig 6: Rds(on) vs. Gate Voltage at Temperature



Typical Performance Characteristics

Fig 7: Transfer Characteristics

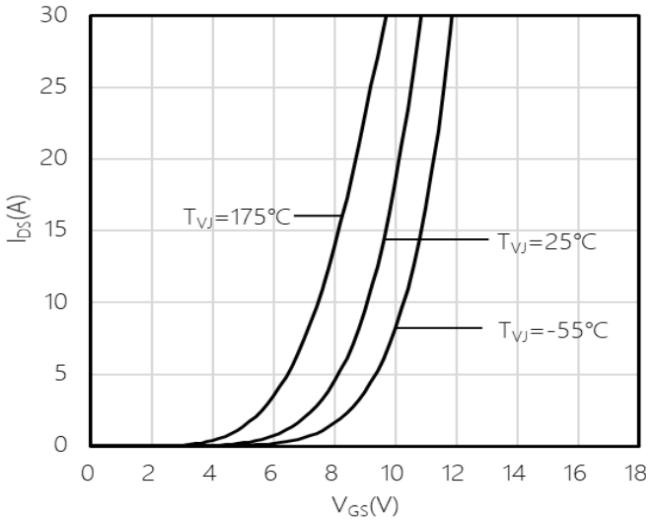


Fig 8: Typical reverse drain current as function of reverse drain voltage. Tvj=-55℃

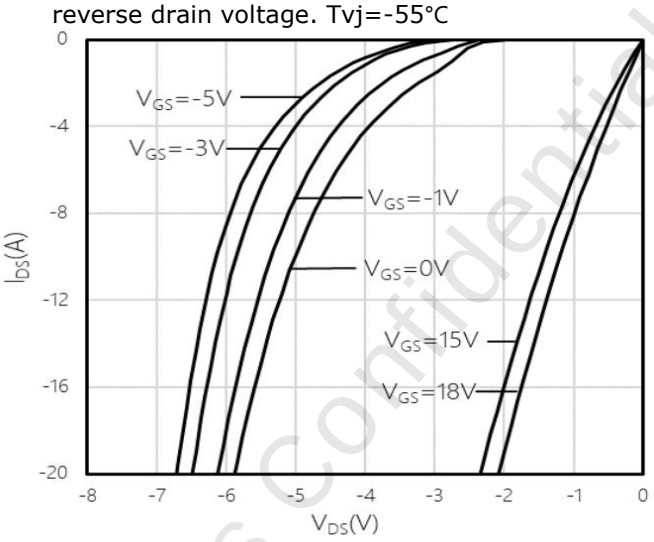


Fig 9: Typical reverse drain current as function of reverse drain voltage. Tvj=25℃

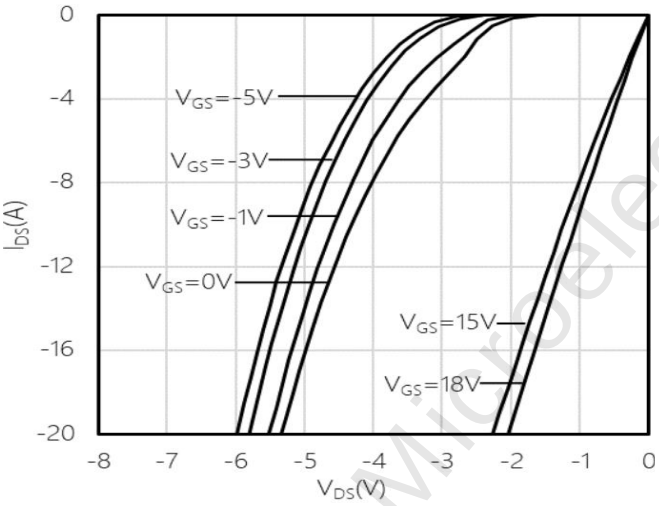


Fig 10: Typical reverse drain current as function of reverse drain voltage. Tvj=175℃

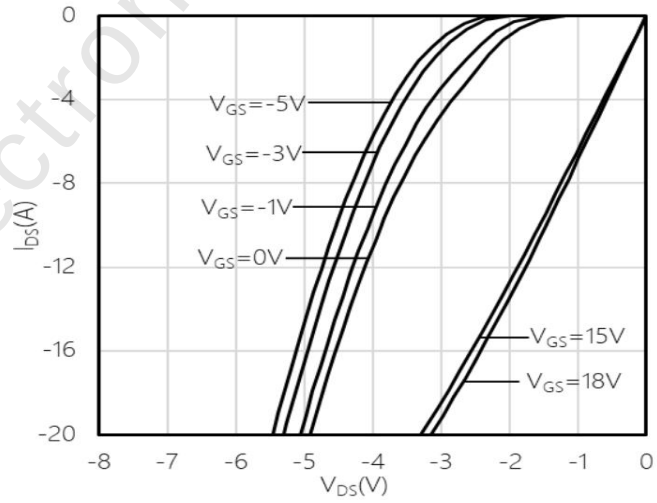


Fig 11: Threshold Voltage vs. Temperature

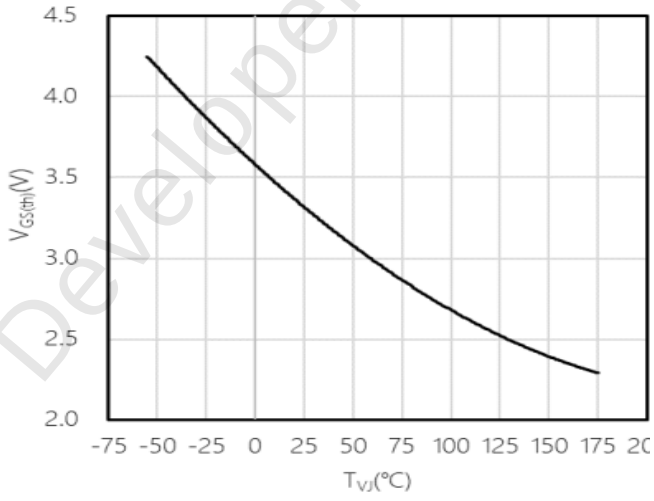


Fig 12: Capacitance Characteristics

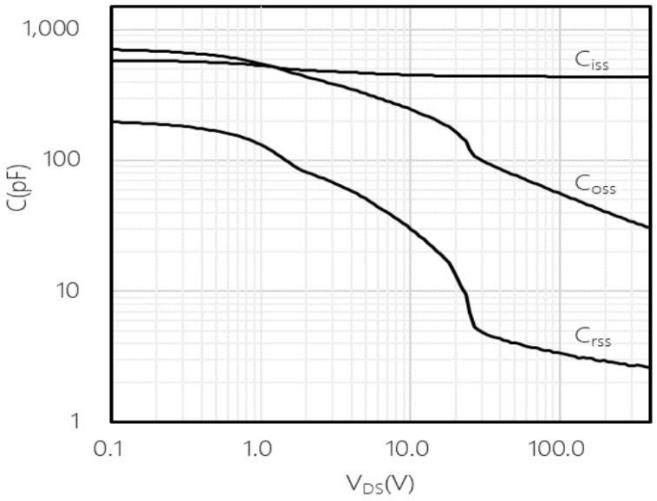


Fig 13: Gate Charge Characteristics

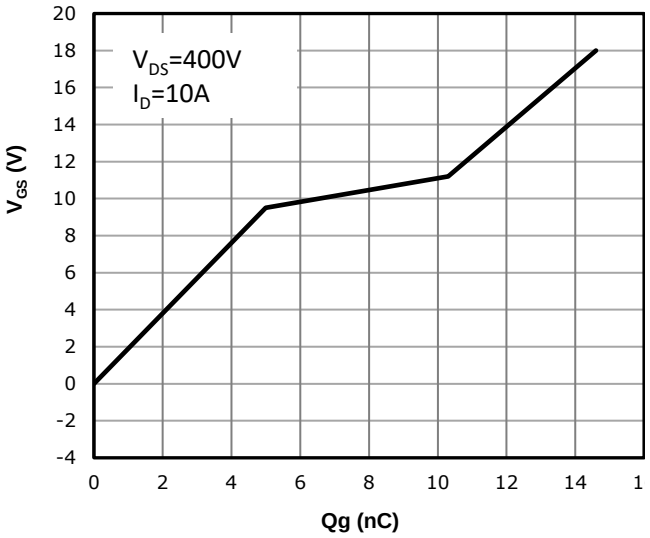


Fig 14: Clamped Inductive Switching energy vs Rg

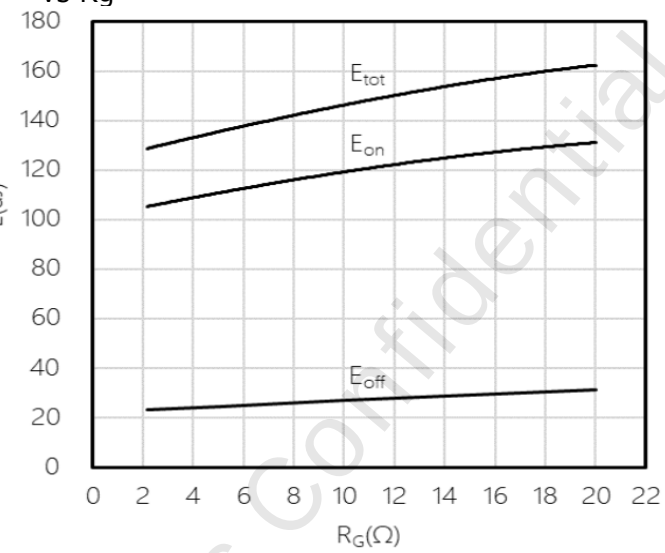


Fig 15: Power Dissipation

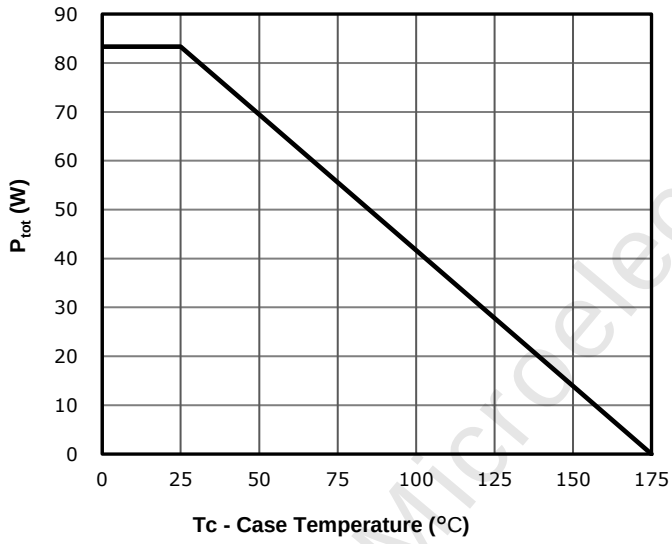


Fig 16: Drain Current Derating

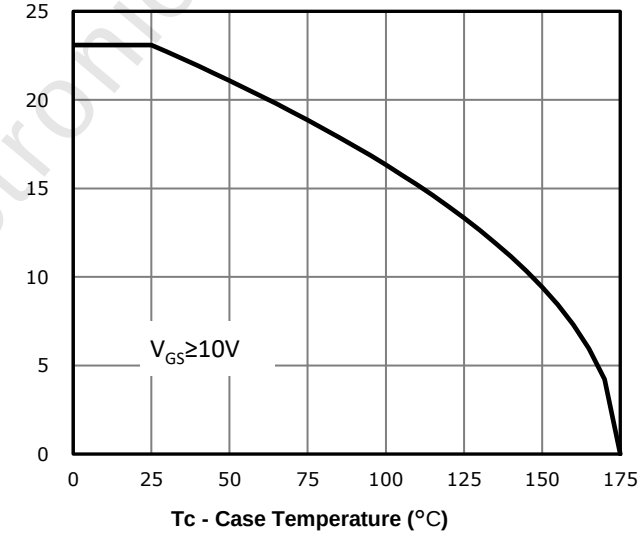
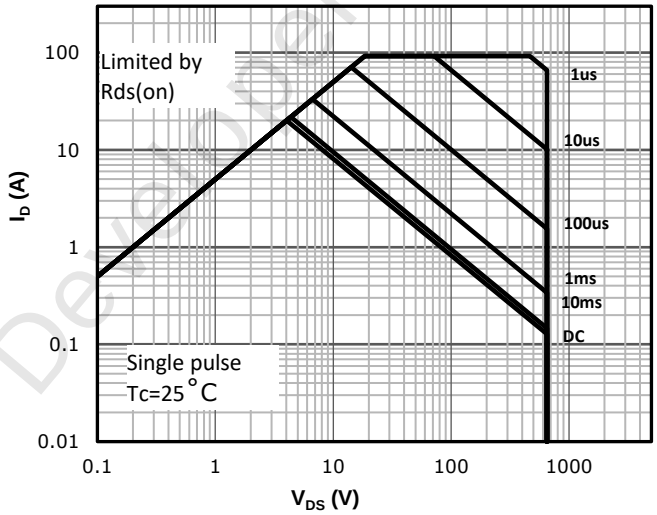
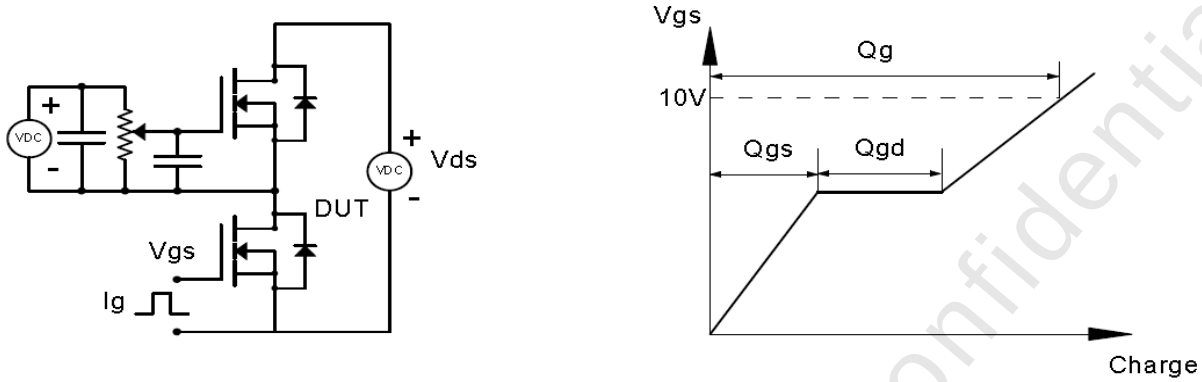


Fig 17: Safe Operating Area

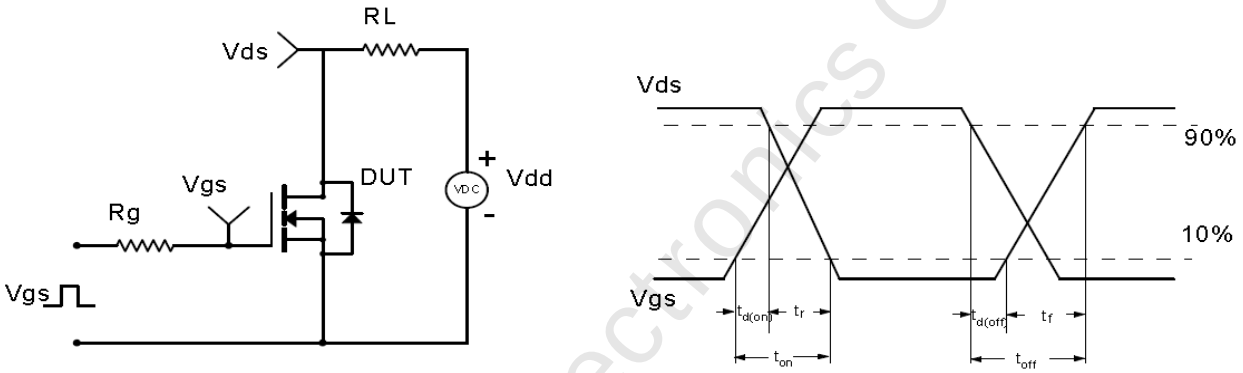


Test Circuit & Waveform

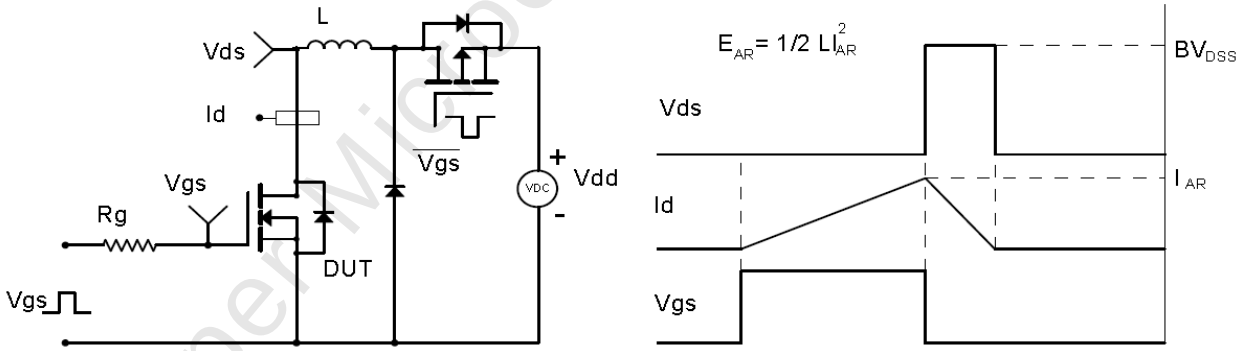
Gate Charge Test Circuit & Waveform



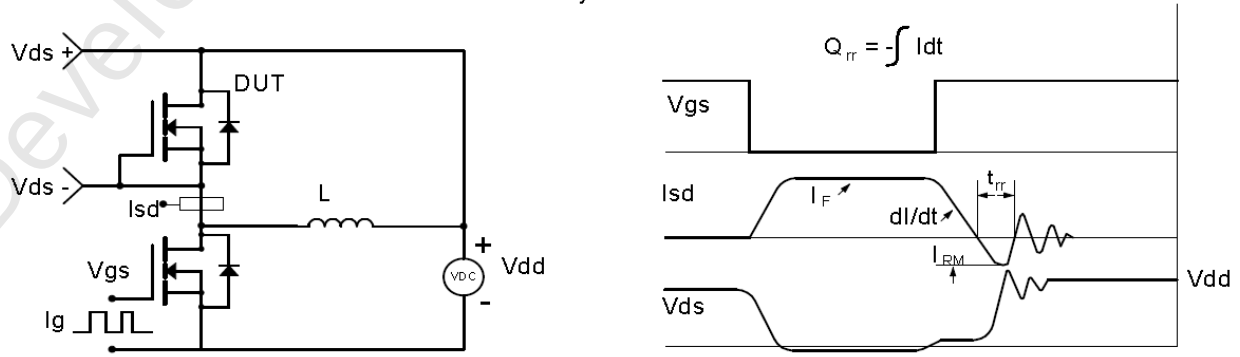
Resistive Switching Test Circuit & Waveforms



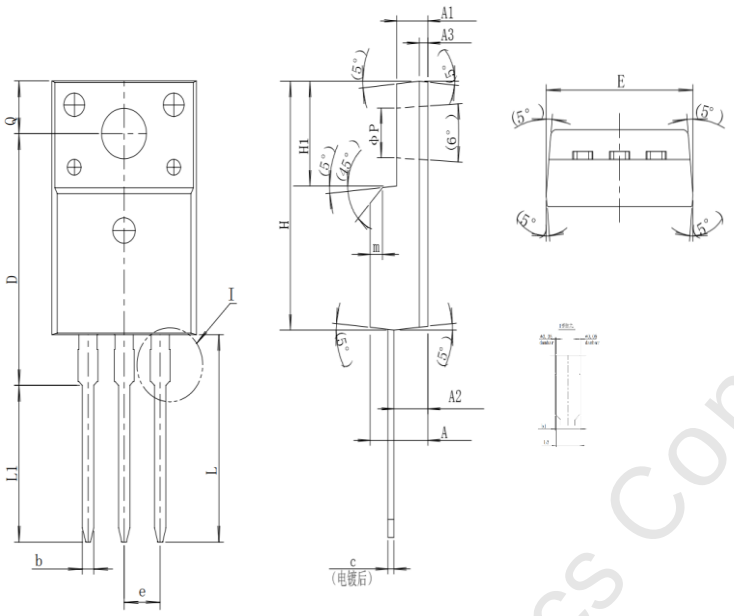
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

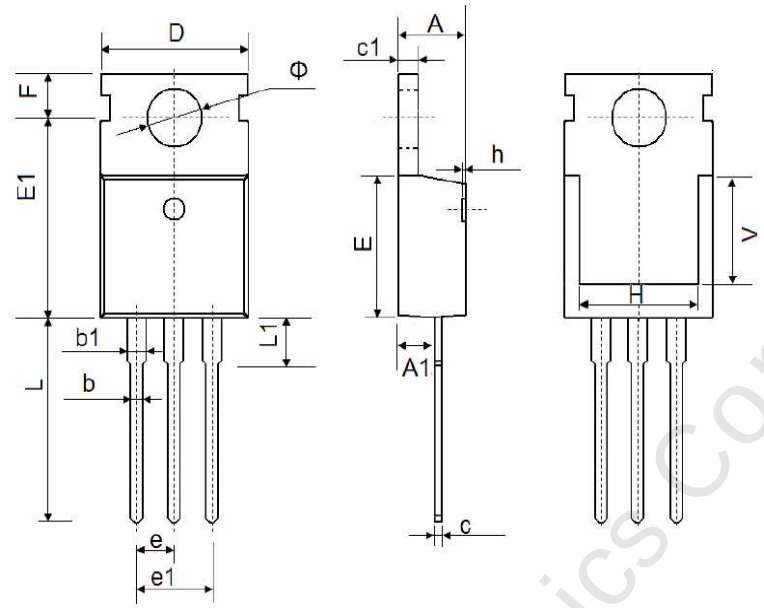


Package Outline: TO-220F



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

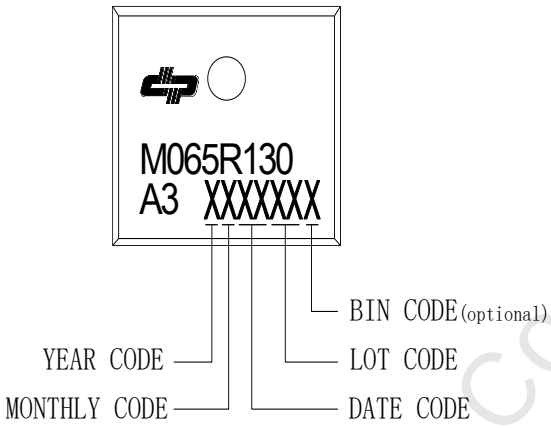
Package Outline: TO-220-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.70	0.169	0.185
A1	2.25	2.55	0.089	0.100
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.33	0.65	0.013	0.026
c1	1.20	1.40	0.047	0.055
D	9.91	10.25	0.390	0.404
E	8.95	9.75	0.352	0.384
E1	12.65	12.95	0.498	0.510
e	2.54 BSC.		0.100 BSC.	
e1	4.98	5.18	0.196	0.204
F	2.65	2.95	0.104	0.116
H	7.90	8.10	0.311	0.319
h	0.00	0.30	0.000	0.012
L	12.90	13.40	0.508	0.528
L1	2.85	3.25	0.112	0.128
V	7.500 Ref.		0.295 Ref.	
Φ	3.400	3.800	0.134	0.150

Part Marking Information

DPM065R130A3G2



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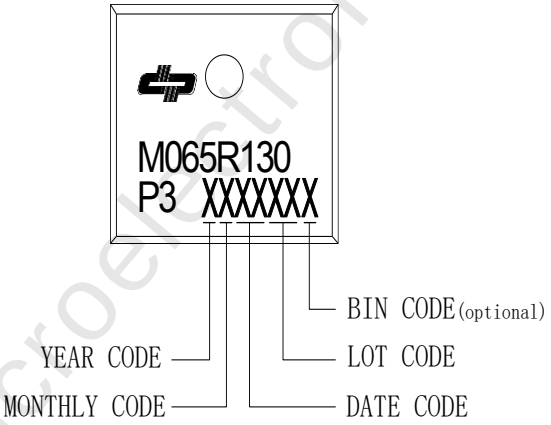

Revision History

Revison	Major changes
1.1	Release for formal version1.1

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