



Product Summary

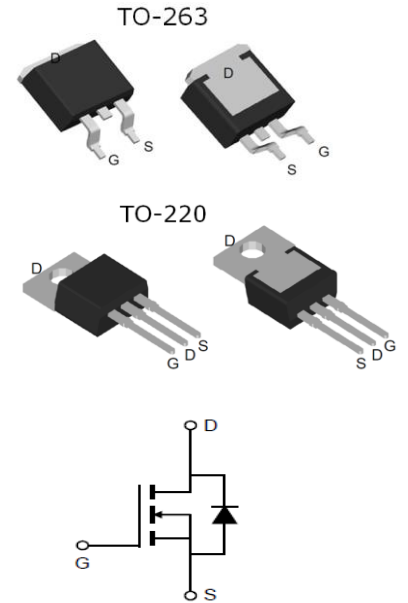
Part #	V _{DS}	R _{DS(on).typ}	I _D
DP053N08BG	80V	4.4mΩ	120A
DP056N08PG		4.6mΩ	

Features

- Uses advanced Trench MOSFET-DPMOS technology
- Extremely low on-resistance R_{DS(on)}
- Excellent Q_gxR_{DS(on)} product(FOM)
- Qualified according to JEDEC criteria

Applications

- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)



100% Avalanche Tested
100% R_g Tested

Package Marking and Ordering Information

Part #	Marking	Package	Packing
DP056N08PG	DP056N08	TO-220	Tube
DP053N08BG	DP053N08	TO-263	Tube&Reel



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DS}	80	V
Continuous drain current	I _D	129	A
T _C = 25°C (Silicon limit)		120	
T _C = 100°C (Silicon limit)		82	
Pulsed drain current (T _C = 25°C, t _p limited by T _{jmax})	I _{D pulse}	480	A
Avalanche energy, single pulse (ID=34A, Rg=25) ^[1]	E _{AS}	289	mJ
Gate-Source voltage	V _{GS}	±20	V
Power dissipation (T _C = 25°C)	P _{tot}	179	W
Operating junction and storage temperature	T _j , T _{stg}	-55...+150	°C

[1].EAS is tested at starting T_j = 25°C, V_{GS} = 10V.

**Thermal Resistance**

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.70	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

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}	80	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	0.02	1	μA	$V_{DS}=80V, V_{GS}=0V$ $T_j=25^\circ C$ $T_j=125^\circ C$
Gate-source leakage current	I_{GSS}	-	± 10	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	4.6	5.5	mΩ	$V_{GS}=10V, I_D=60A$ TO-220 TO-263
Gate resistance	R_g	-	1.3	2.6	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$
Transconductance ^[2]	g_{fs}	-	84	-	S	$V_{DS}=5V, I_D=60A$

Dynamic Characteristic^[2]

Input Capacitance	C_{iss}	-	3100	-	pF	$V_{GS}=0V, V_{DS}=40V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	640	-		
Reverse Transfer Capacitance	C_{rss}	-	18	-		
Gate Total Charge	Q_g	-	58	-	nC	$V_{GS}=10V, V_{DS}=40V,$ $I_D=60A, f=1MHz$
Gate-Source charge	Q_{gs}	-	19	-		
Gate-Drain charge	Q_{gd}	-	15	-		
Turn-on delay time	$t_{d(on)}$	-	24	-	ns	$V_{GS}=10V, V_{DD}=40V,$ $R_{G_ext}=2.7\Omega$
Rise time	t_r	-	99	-		
Turn-off delay time	$t_{d(off)}$	-	41	-		
Fall time	t_f	-	93	-		

**Body Diode Characteristic**

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.92	1.3	V	$V_{GS}=0V, I_{SD}=60A$
Diode continuous forward current	I_S	-	120	-	A	TC = 25°C
Diode pluse current	$I_{S\ pluse}$	-	480	-	A	TC = 25°C
Body Diode Reverse Recovery Time ^[2]	t_{rr}	-	48.2	-	ns	$I_F=60A, dI/dt=100A/\mu s$
Body Diode Reverse Recovery Charge ^[2]	Q_{rr}	-	56	-	nC	

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



Typical Performance Characteristics

Fig 1: Output Characteristics

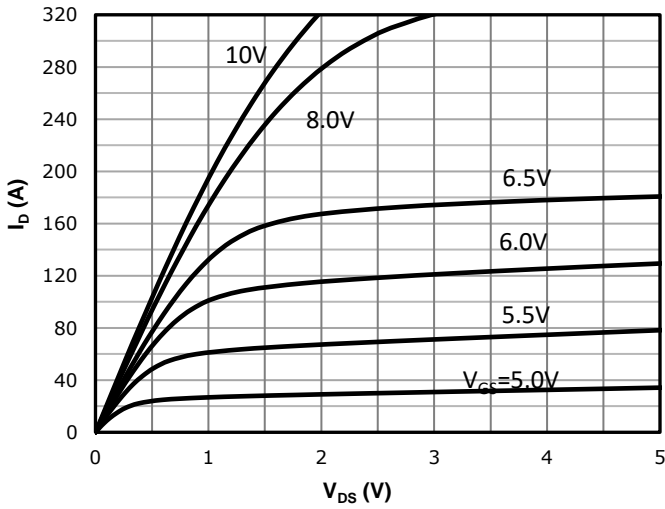


Fig 2: Transfer Characteristics

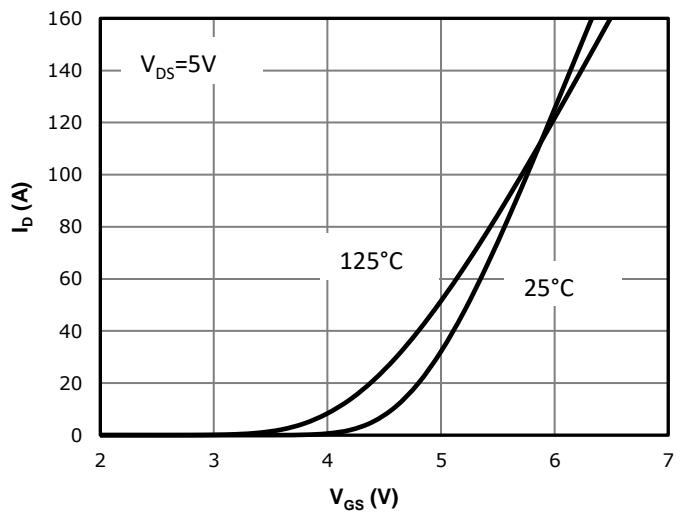


Fig 3: Rds(on) vs Drain Current and Gate Voltage

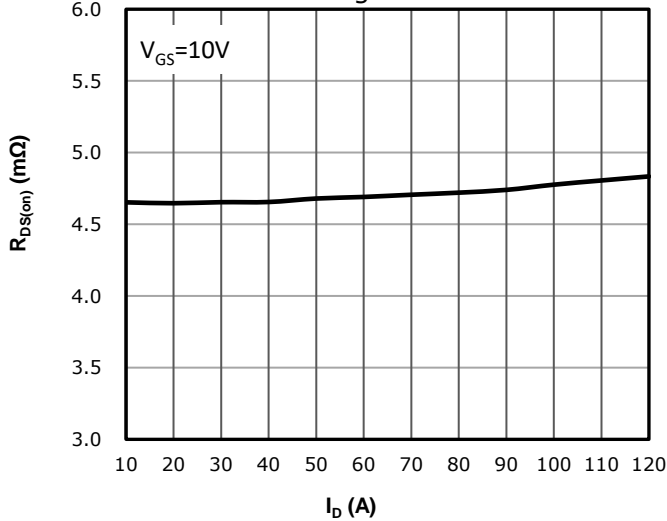


Fig 4: Rds(on) vs Gate Voltage

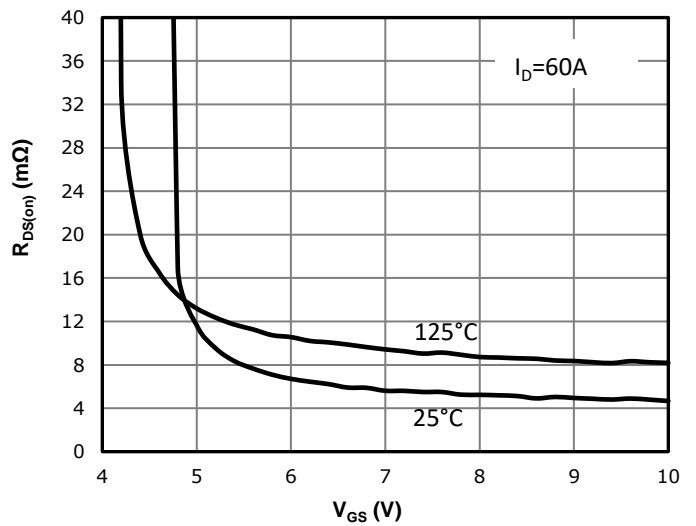


Fig 5: Rds(on) vs. Temperature

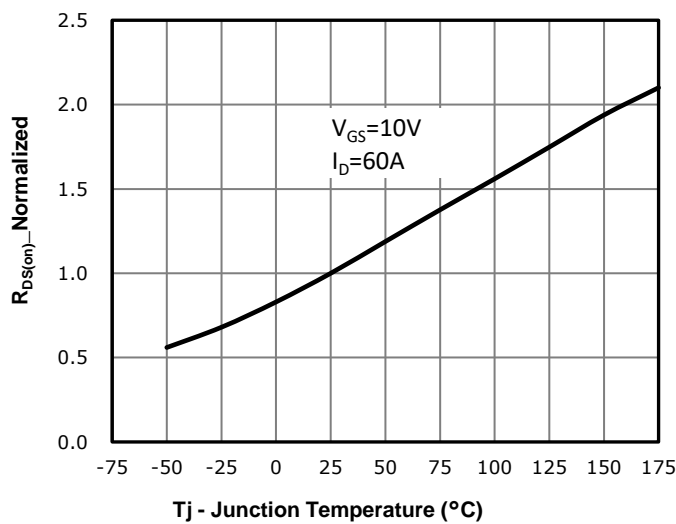


Fig 6: Capacitance Characteristics

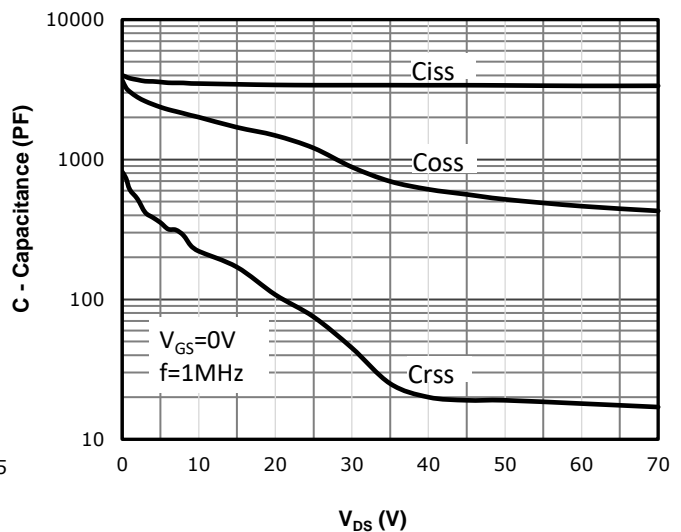




Fig 7: Gate Charge Characteristics

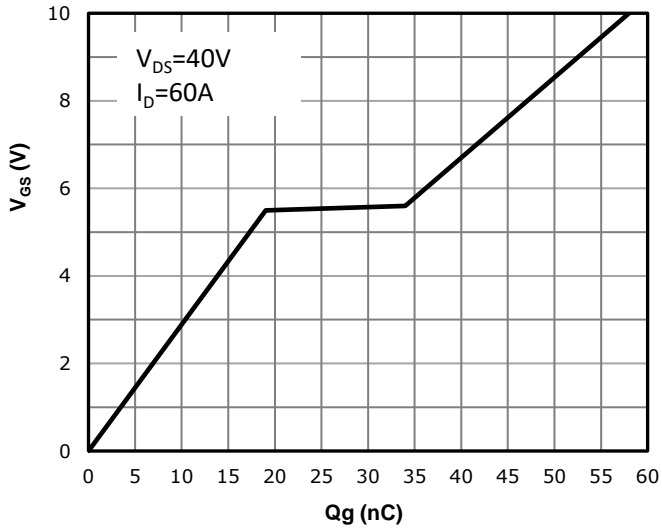


Fig 8: Body-diode Forward Characteristics

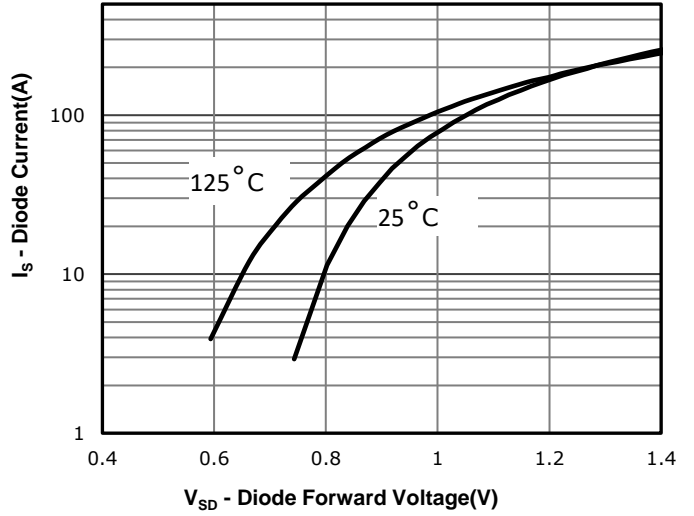


Fig 9: Power Dissipation

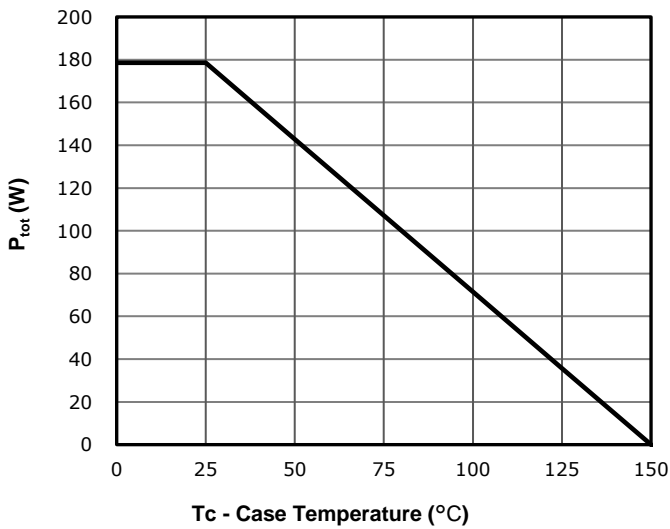


Fig 10: Drain Current Derating

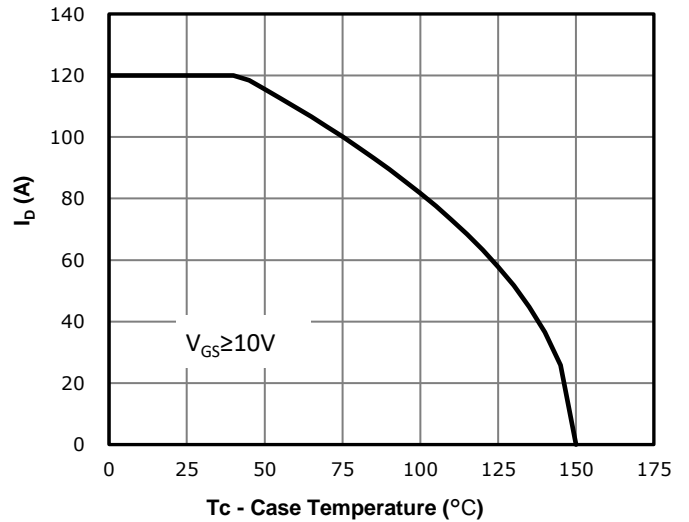


Fig 11: Safe Operating Area

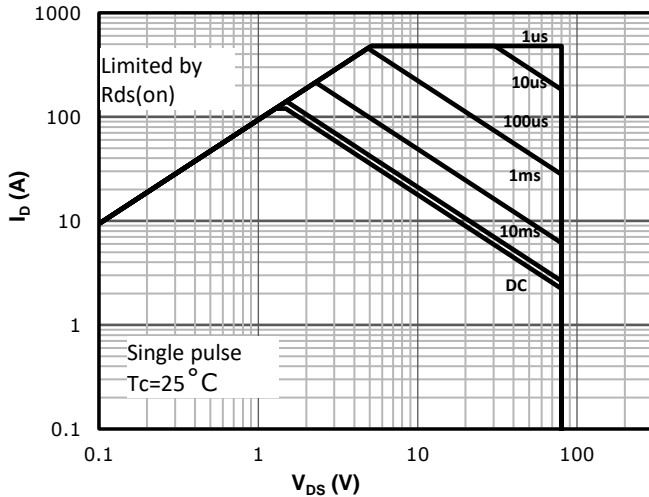
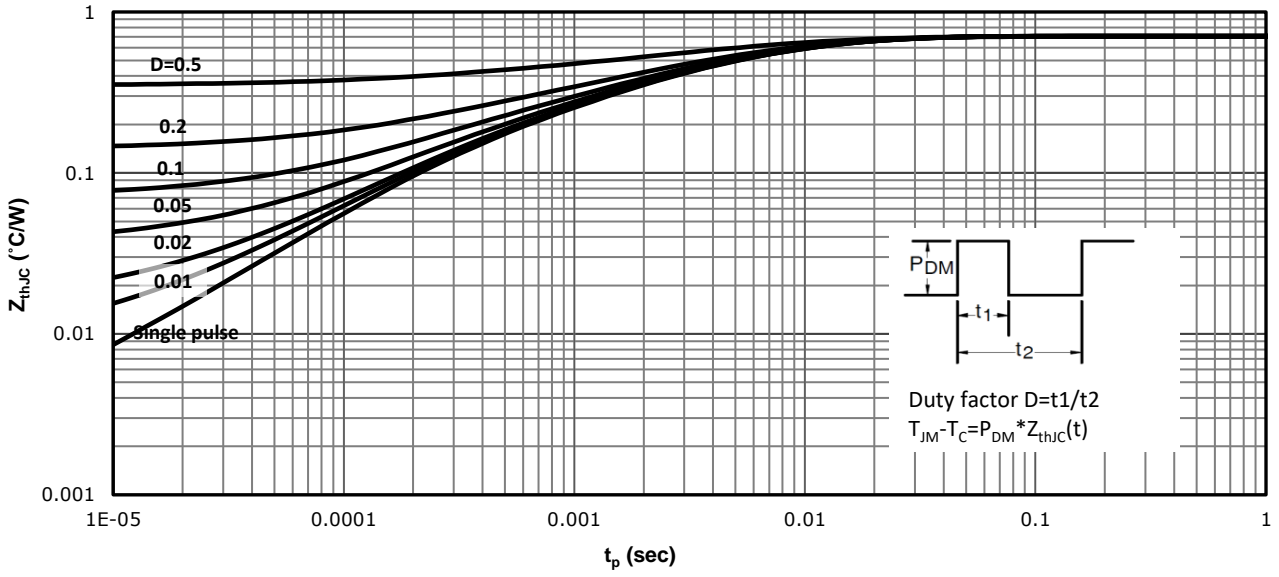




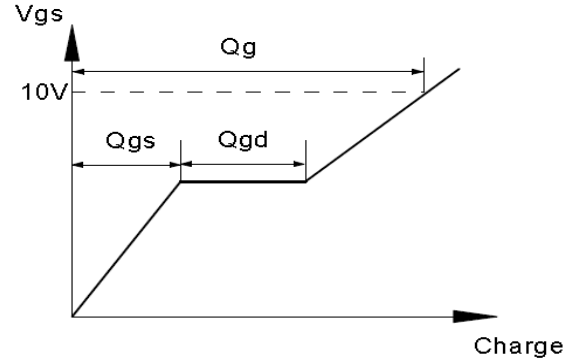
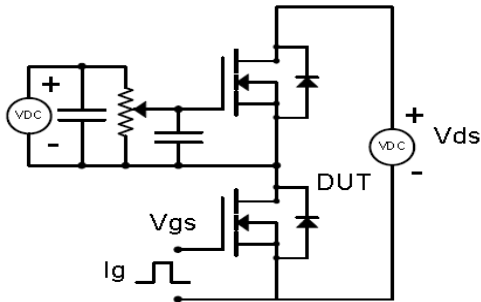
Fig 12: Max. Transient Thermal Impedance



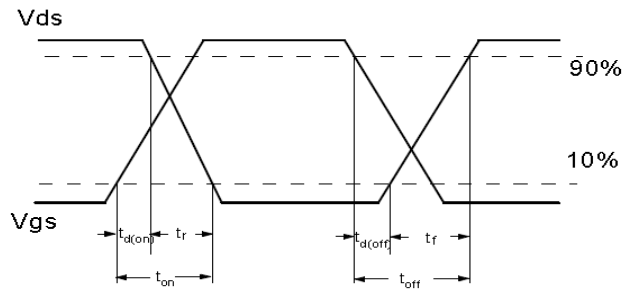
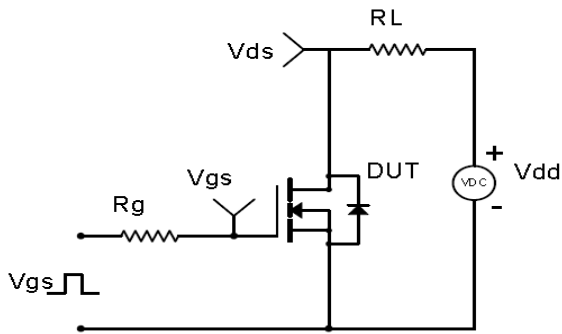


Test Circuit & Waveform

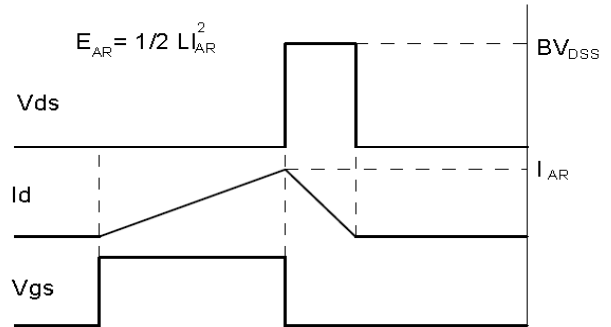
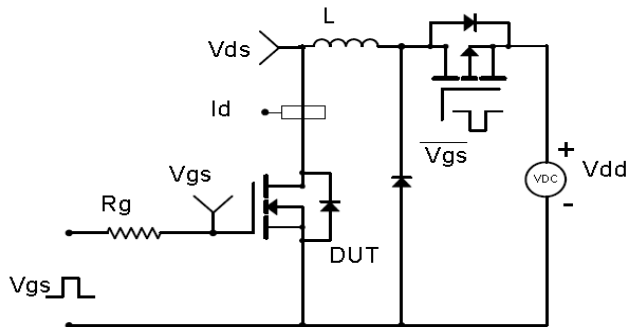
Gate Charge Test Circuit & Waveform



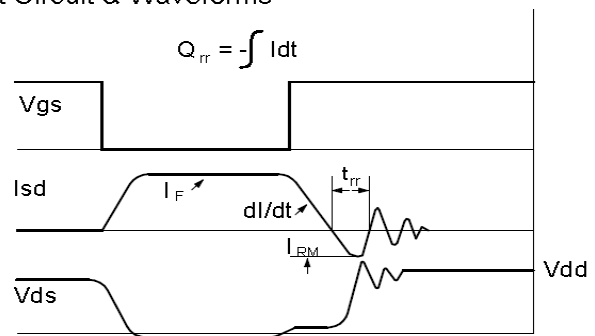
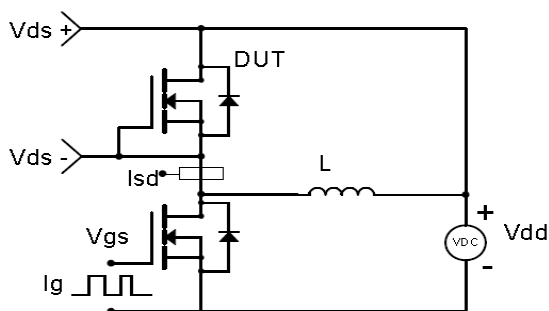
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

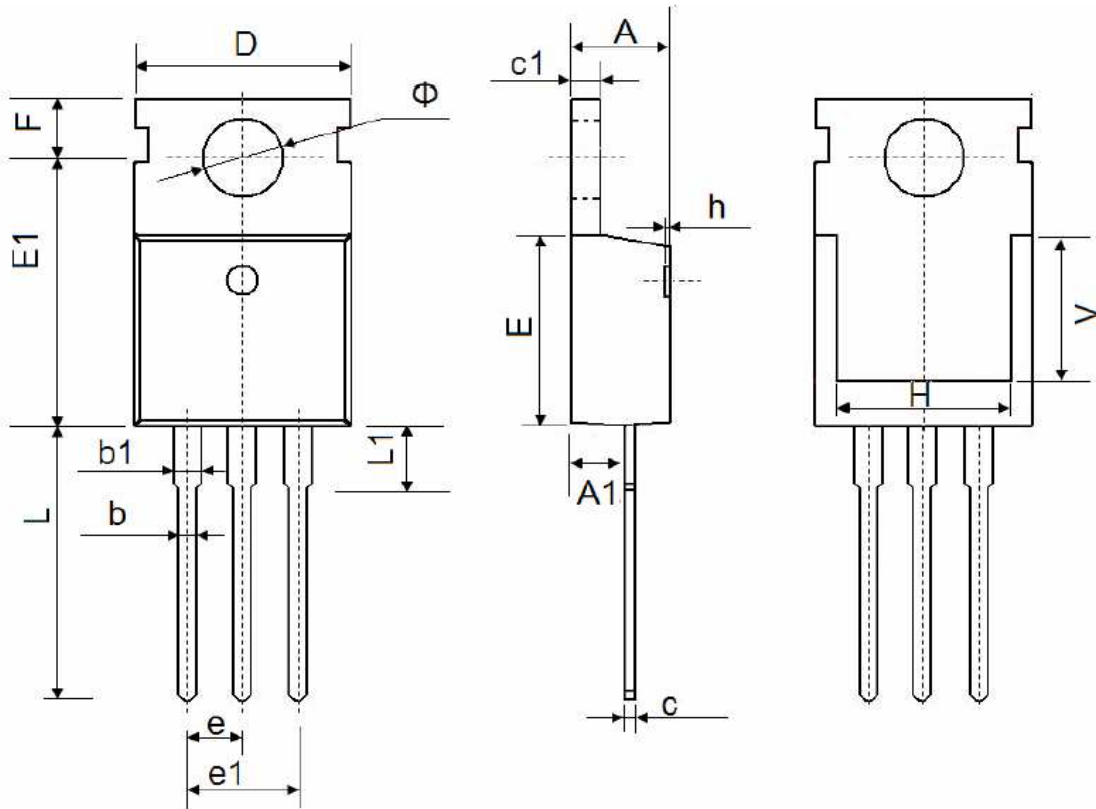


Diode Recovery Test Circuit & Waveforms





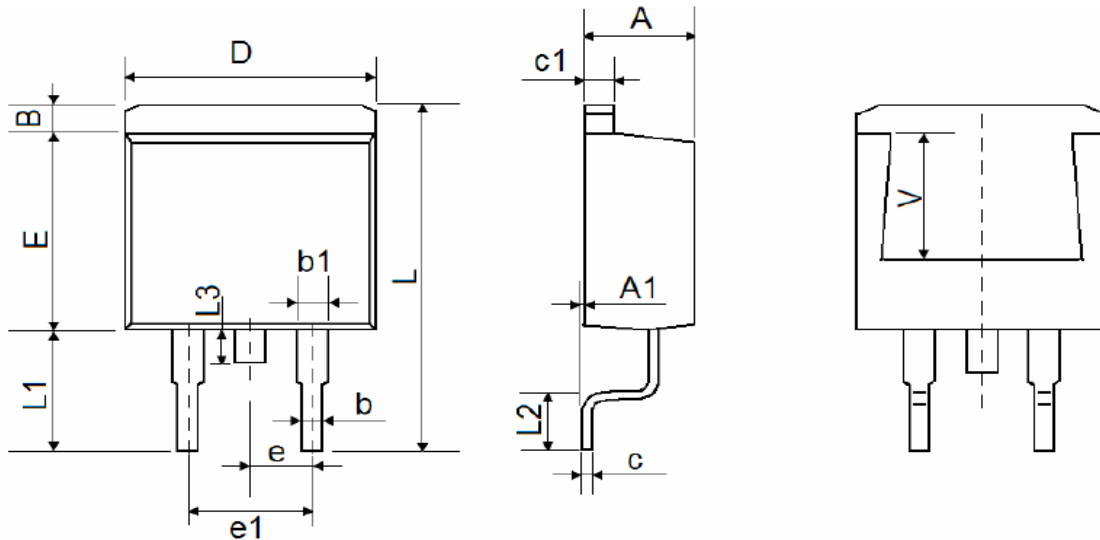
Package Outline: TO-220-3L



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



Package Outline: TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.80	0.173	0.189
A1	0.00	0.15	0.000	0.006
B	1.17	1.37	0.046	0.054
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.31	0.53	0.012	0.021
c1	1.17	1.37	0.046	0.054
D	10.01	10.31	0.394	0.406
E	8.50	8.90	0.335	0.350
e	2.54 BSC.		0.100 BSC.	
e1	4.98	5.18	0.196	0.204
L	15.05	15.45	0.593	0.608
L1	5.08	5.48	0.200	0.216
L2	2.34	2.74	0.092	0.108
L3	1.30	1.70	0.051	0.067
V	5.600 Ref.		0.220 Ref.	



深圳市德普微电子有限公司

DP053N08BG, DP056N08PG

DPMOS N-MOSFET 80V, 4.6mΩ, 120A

Revision History

Revision	Major changes
1.0	Release for formal version