



Datasheet of DP6580

(TO-252/263/220)

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**Features**

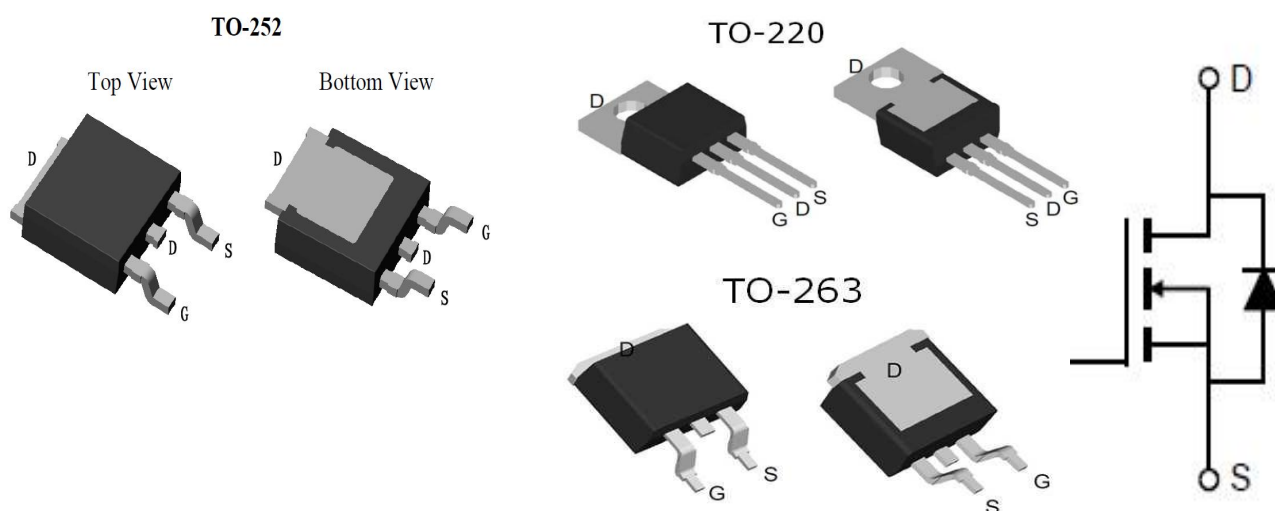
- Uses advanced Trench MOS technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

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

Product Summary

V_{DS}	65V
$R_{DS(on)}$ typ.	7.1mΩ
I_D	85A

100% DVDS Tested**100% Avalanche Tested****Package Marking and Ordering Information**

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
DP6580	-	TO-252	Reel	N/A	N/A	2500pcs
		TO-220	Tube	N/A	N/A	50pcs
		TO-263	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	65	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 25^\circ\text{C}$ (Package limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	85 87 54	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	340	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	400	mJ



Gate-Source voltage	V_{GS}	±25	V
Power dissipation ($T_c = 25^\circ\text{C}$)	P_{tot}	98	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.27	$^\circ\text{C}/\text{W}$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	102	

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

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

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	65	-	-	V	$V_{GS}=0V, I_D=250\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.05	1 5	μA	$V_{DS}=65V, V_{GS}=0V$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=25V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	7.1	8.4	$m\Omega$	$V_{GS}=10V, I_D=40A,$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$
Transconductance	g_{fs}	-	84	-	S	$V_{DS}=5V, I_D=40A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	5101	-	pF	$V_{GS}=0V, V_{DS}=32V,$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	319	-		
Reverse Transfer Capacitance	C_{rss}	-	292	-		
Gate Total Charge	Q_G	-	77	-	nC	$V_{GS}=10V, V_{DS}=50V,$ $I_D=40A, f=1\text{MHz}$
Gate-Source charge	Q_{gs}	-	18	-		
Gate-Drain charge	Q_{gd}	-	30	-		
Turn-on delay time	$t_{d(on)}$	-	28	-	ns	$V_{GS}=10V, V_{DD}=20V,$ $R_{G_ext}=3\Omega, I_D=40A,$
Rise time	t_r	-	64	-		
Turn-off delay time	$t_{d(off)}$	-	66	-		
Fall time	t_f	-	28	-		



Gate resistance	R_G	-	2.6	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$
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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.9	1.3	V	$V_{GS}=0V, I_{SD}=40A$
Body Diode Reverse Recovery Time	t_{rr}	-	42	-	ns	$I_F=40A, dI/dt=100A/\mu$ s
Body Diode Reverse Recovery Charge	Q_{rr}	-	55	-	nC	



Typical Performance Characteristics

Fig 1: Output Characteristics

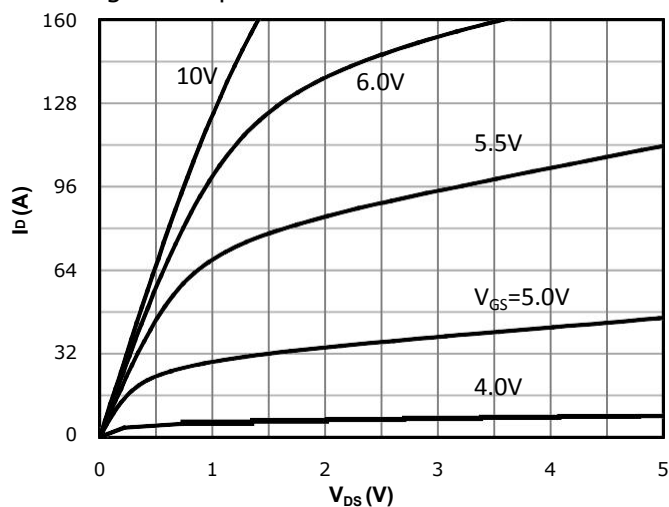


Fig 2: Transfer Characteristics

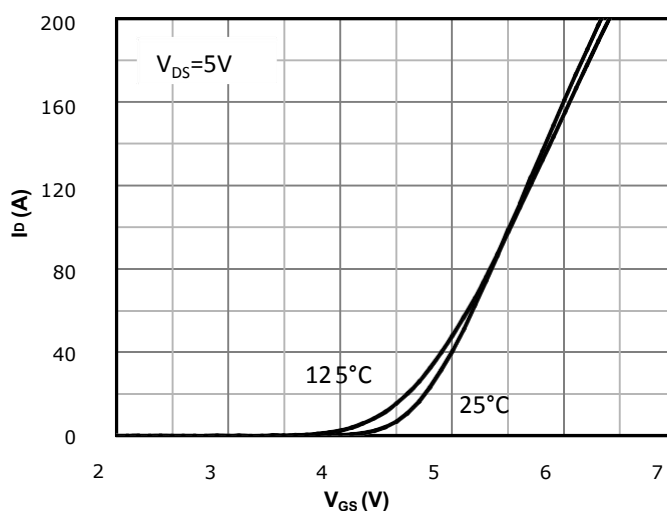


Fig 3: Rds(on) vs Drain Current and Gate Voltage

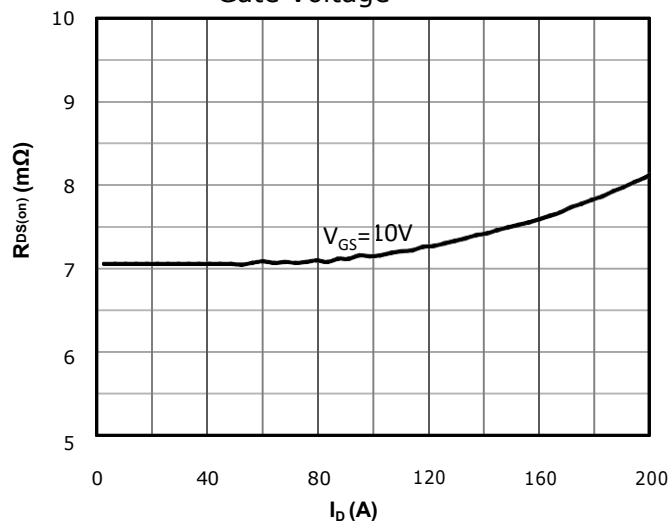


Fig 4: Rds(on) vs Gate Voltage

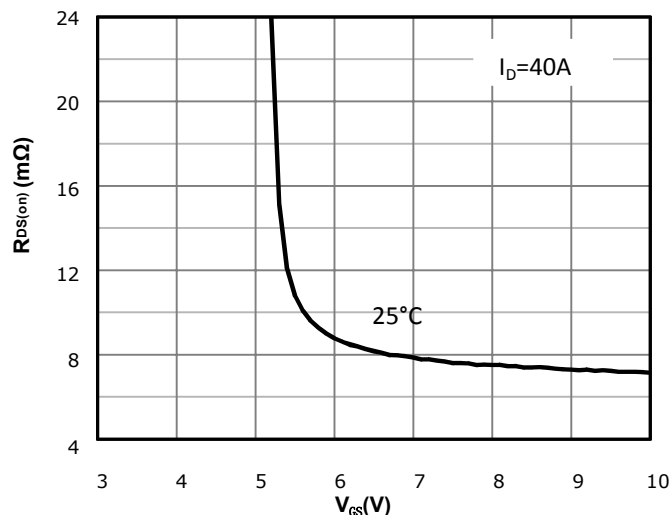


Fig 5: Rds(on) vs. Temperature

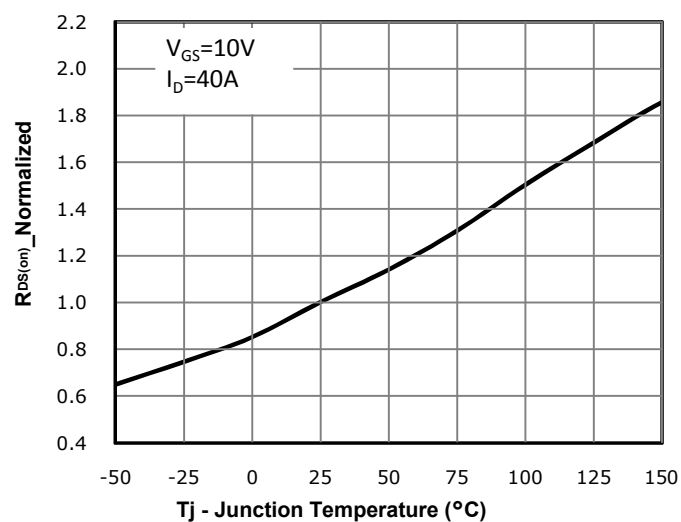
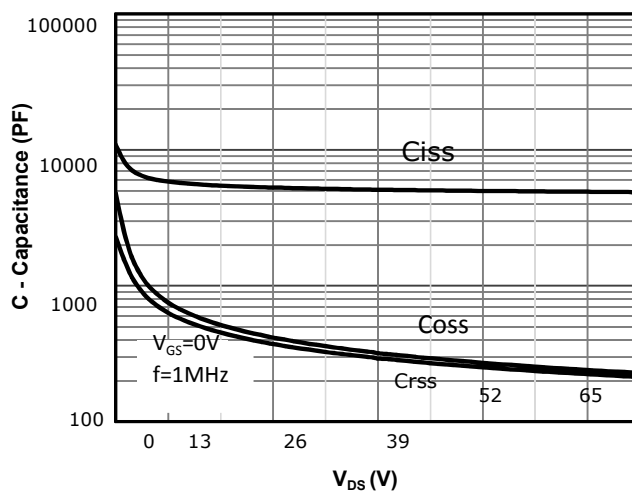


Fig 6: Capacitance Characteristics



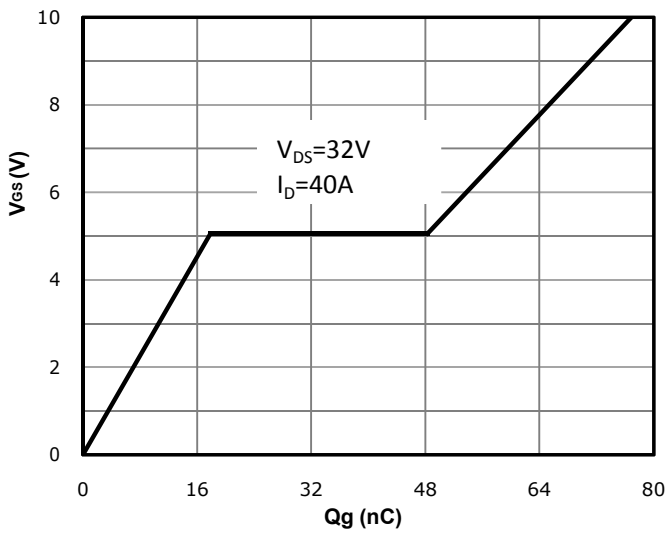
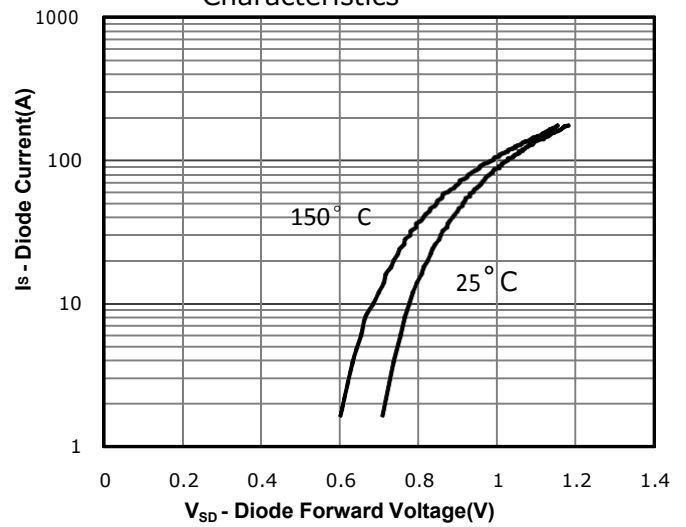
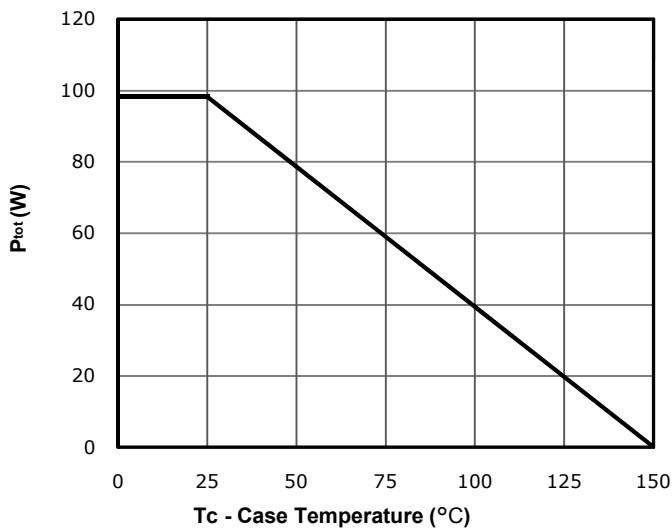
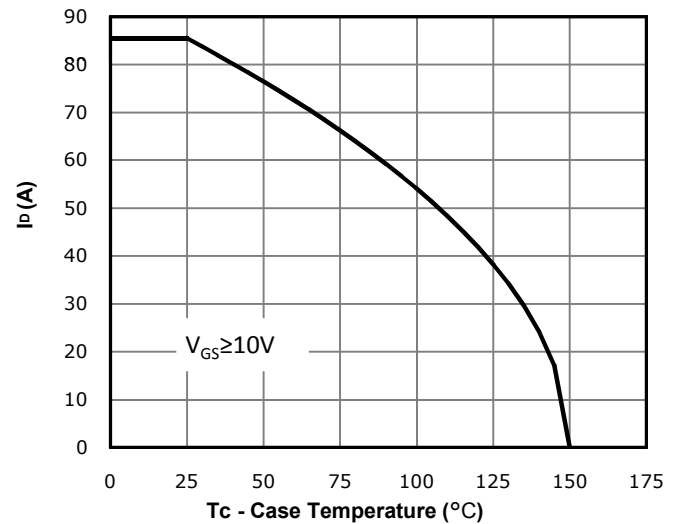
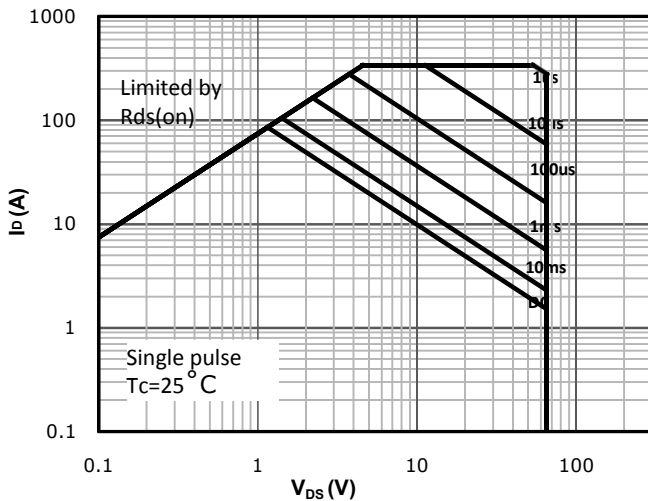
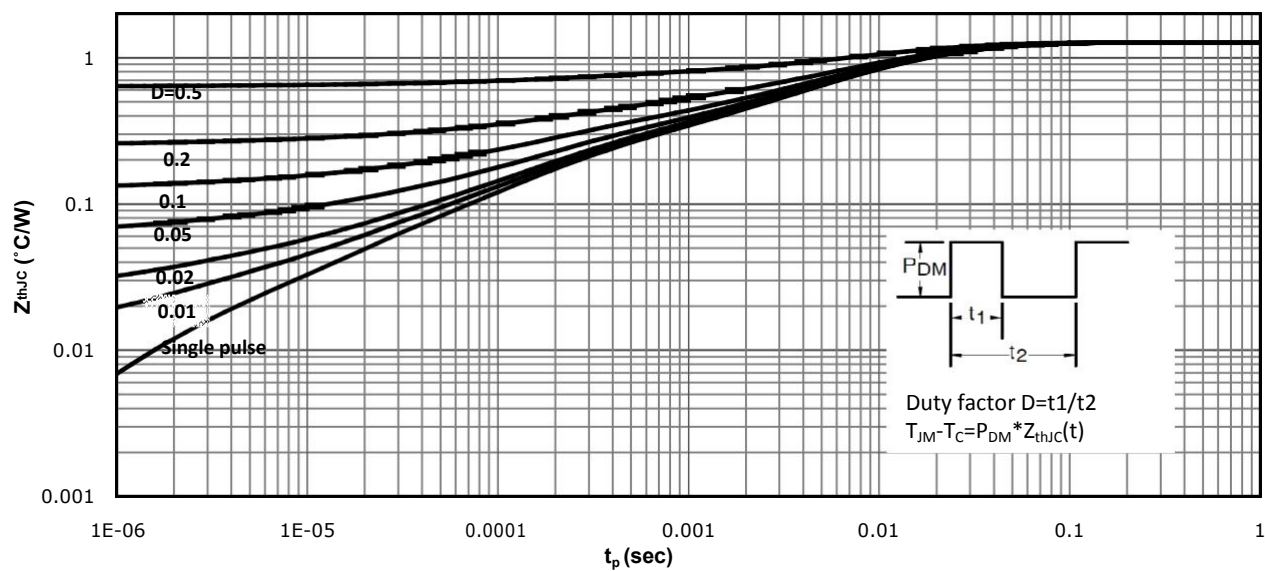
**Fig 7: Gate Charge Characteristics****Fig 8: Body-diode Forward Characteristics****Fig 9: Power Dissipation****Fig 10: Drain Current Derating****Fig 11: Safe Operating Area**



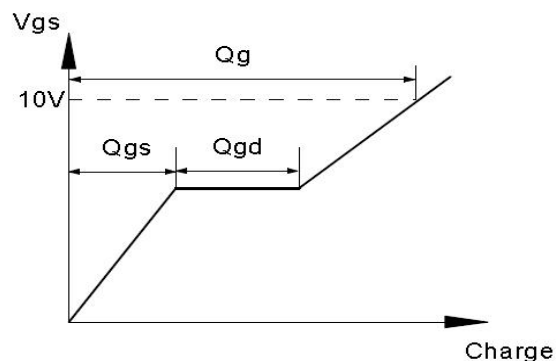
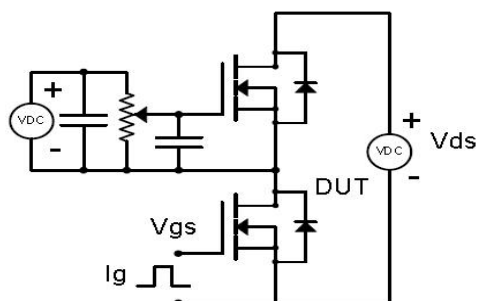
Fig 12: Max. Transient Thermal Impedance



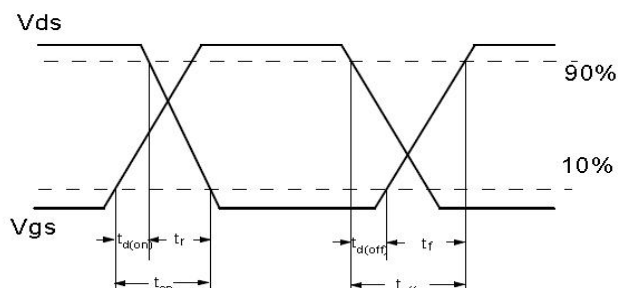
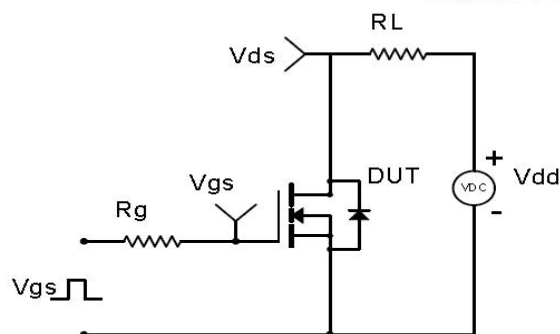


Test Circuit & Waveform

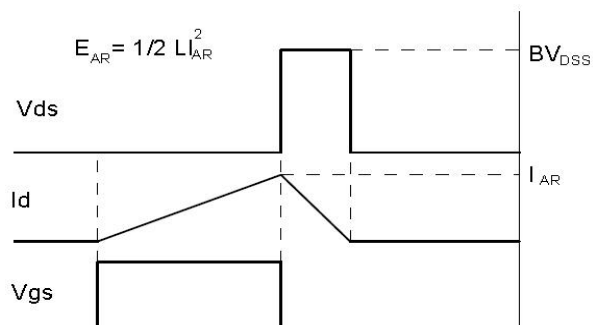
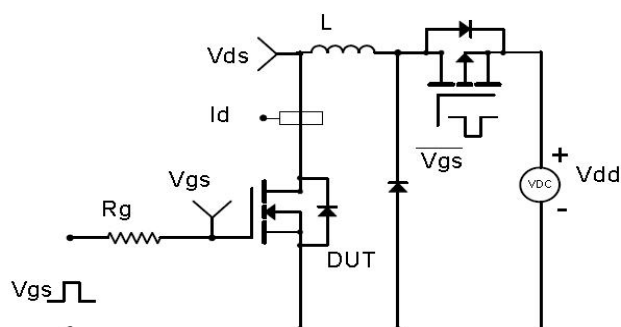
Gate Charge Test Circuit & Waveform



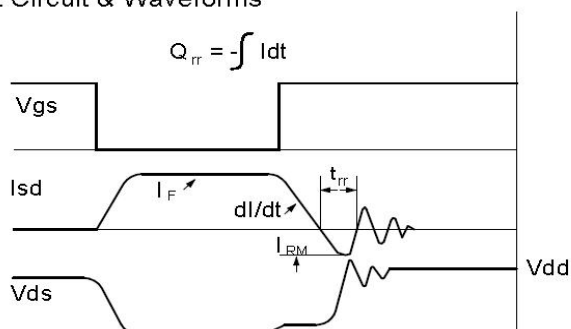
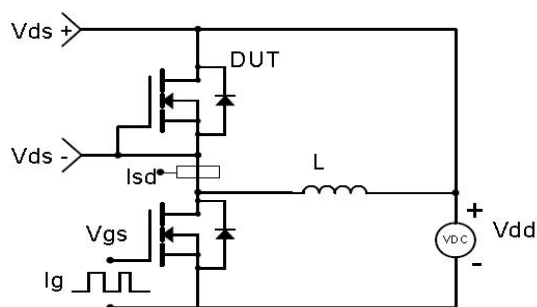
Resistive Switching Test Circuit & Waveforms

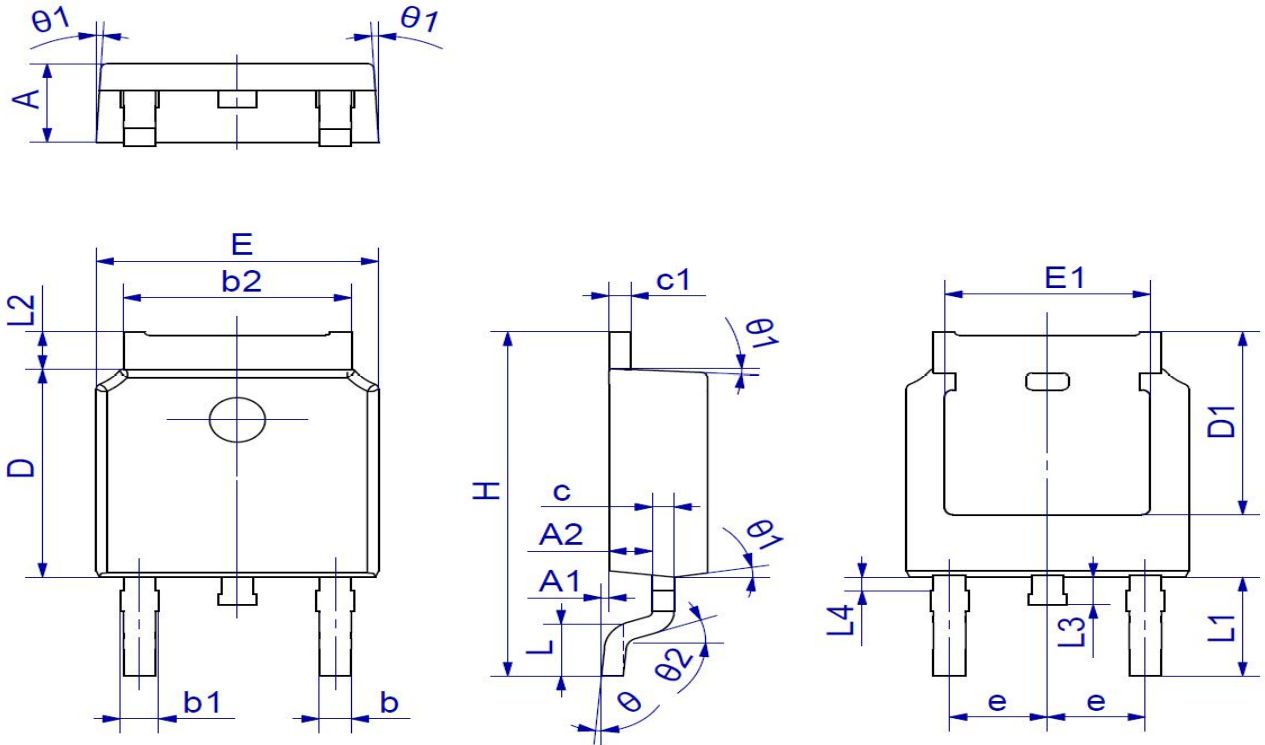


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

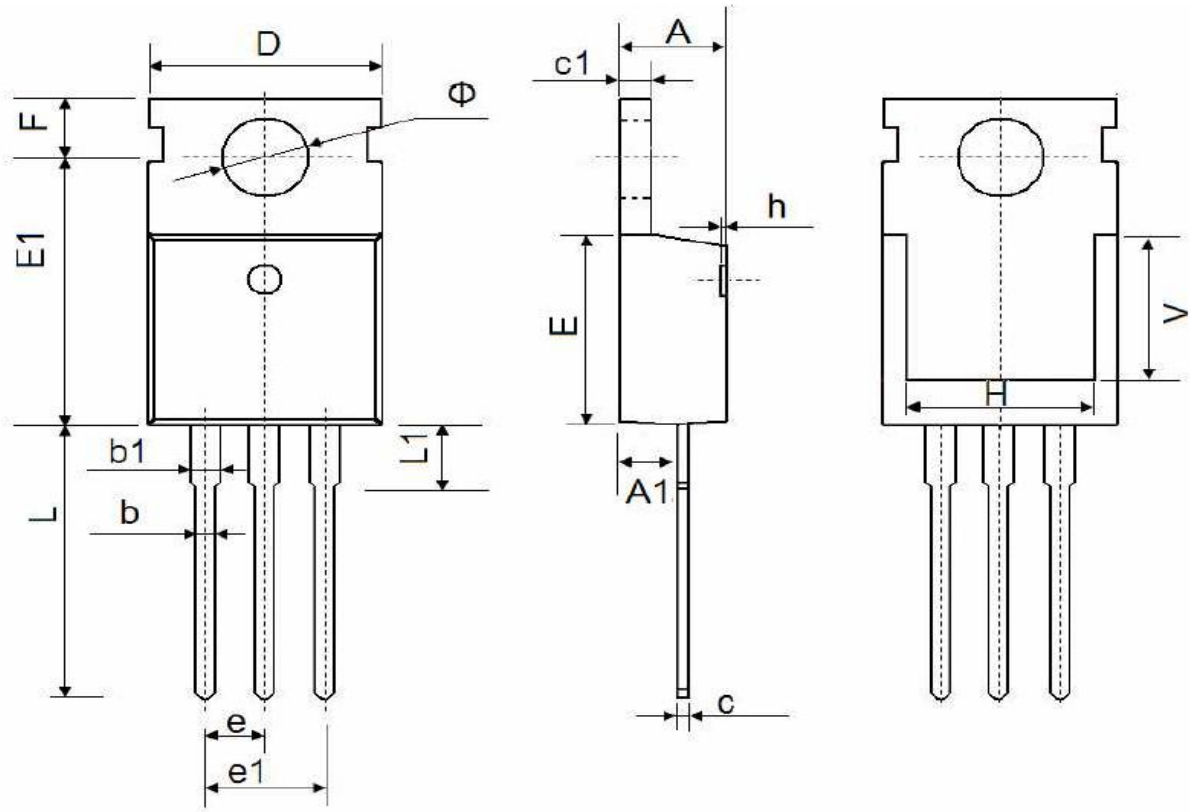


Diode Recovery Test Circuit & Waveforms

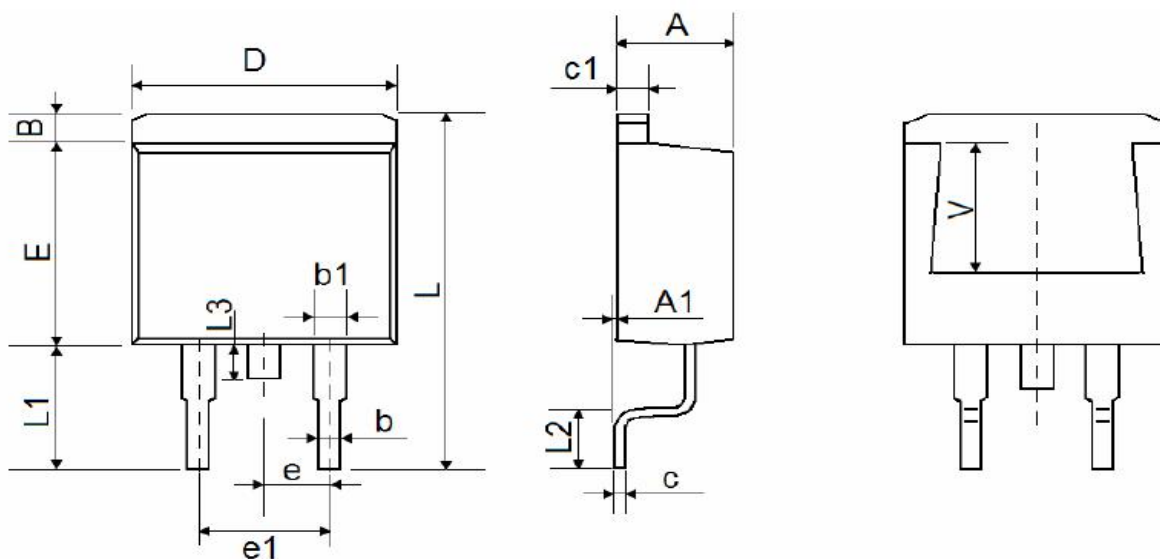


**Package Outline: TO-252-3L**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2	2.6	0.079	0.102
A1	0	0.15	0.000	0.006
A2	0.76	1.36	0.030	0.054
b	0.61	0.85	0.024	0.033
b1	0.71	0.91	0.028	0.036
b2	5.04	5.64	0.198	0.222
c	0.508 TYP.		0.02 TYP.	
c1	0.508 TYP.		0.02 TYP.	
D	5.7	6.3	0.224	0.248
D1	5	5.6	0.197	0.220
E	6.3	6.9	0.248	0.272
E1	4.55	5.15	0.179	0.203
e	2.286 TYP.		0.09 TYP.	
H	9.65	10.4	0.380	0.409
L	1.4	1.7	0.055	0.067
L1	2.90 REF.		0.114 REF.	
L2	0.75	1.35	0.030	0.053
L3	0.6	1.2	0.024	0.047
θ	0°	10°	0°	10°
θ1	5°	9°	5°	9°
θ2	25° REF.		25° REF.	

**Package Outline: TO-220-3L**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
A1	2.25	2.55	0.089	0.1
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	1.2	1.4	0.047	0.055
D	9.91	10.25	0.39	0.404
E	8.95	9.75	0.352	0.384
E1	12.65	12.95	0.498	0.51
e	2.540 Typ.		0.100 Typ.	
e1	4.98	5.18	0.196	0.204
F	2.65	2.95	0.104	0.116
H	7.9	8.1	0.311	0.319
h	0	0.3	0	0.012
L	12.9	13.4	0.508	0.528
L1	2.85	3.25	0.112	0.128
V	7.500 Ref.		0.295 Ref.	
Φ	3.4	3.8	0.134	0.15

**Package Outline: TO-263**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.47	4.67	0.176	0.184
A1	0	0.15	0	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	8.5	8.9	0.335	0.35
e	2.540 Typ.		0.100 Typ.	
e1	4.98	5.18	0.196	0.204
L	15.05	15.45	0.593	0.608
L1	5.08	5.48	0.2	0.216
L2	2.34	2.74	0.092	0.108
L3	1.3	1.7	0.051	0.067
V	5.600 Ref.		0.220 Ref.	



Revision History

Date	Rev	Description	Framer	Review	Approver
2019/12/02	1.1	Increase of TO-263,TO-220	Zhou Hui		

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