

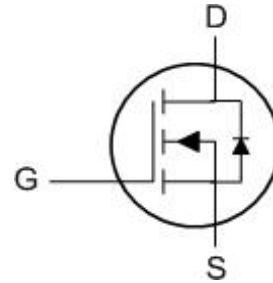


Features

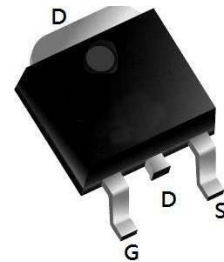
- ◆ Low gate charge
- ◆ Low Ciss
- ◆ Fast switching

Applications

- ◆ Synchronous Rectification for AC/DC Quick Charger
- ◆ Battery management
- ◆ UPS(Uninterruptible Power Supplies)



TO252 Pin Configuration



Parameter	Values	Unit
BV_{DSS}	30	V
I_D	90	A
$R_{Dson(max)}$	5	mΩ
$V_{GS(th)(Typ)}$	1.5	V

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units	
V_{DSS}	Drain-Source Voltage	30	V	
V_{GSS}	Gate-Source Voltage	±20	V	
I_D	Continuous Drain Current	T _C = 25°C	90	A
		T _C = 75°C	56	A
I_{DM}	Pulsed Drain Current ^{note1}	360	A	
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	138	mJ	
P_D	Power Dissipation	T _C = 25°C	67	W
$R_{θJC}$	Thermal Resistance, Junction to Case	1.86	°C/W	
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C	



Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	-	2.4	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=20A$	-	4.2	5.0	m Ω
		$V_{GS}=4.5V, I_D=15A$	-	6.7	8.4	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	1773	-	pF
C_{oss}	Output Capacitance		-	190	-	pF
C_{riss}	Reverse Transfer Capacitance		-	171	-	pF
Q_g	Total Gate Charge	$V_{DS}=24V, I_D=20A,$ $V_{GS}=10V$	-	40	-	nC
Q_{gs}	Gate-Source Charge		-	9	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	9	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V,$ $I_D=20A, R_{GEN}=10\Omega,$ $V_{GS}=10V$	-	13.0	-	ns
t_r	Turn-on Rise Time		-	72.0	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	78.0	-	ns
t_f	Turn-off Fall Time		-	50.0	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	350	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	-	-	1.2	V

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, R_G=25\Omega, L=0.5\text{mH}, I_{AS}=15A$
 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, L=0.5\text{mH}, R_G=25\Omega, I_{AS}=35A$



Typical Performance Characteristics

Figure 1: Output Characteristics

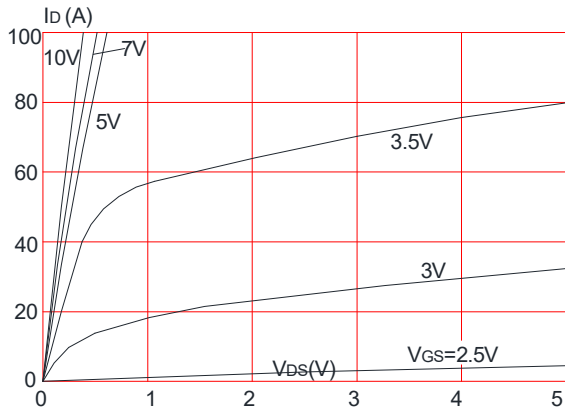


Figure 2: Typical Transfer Characteristics

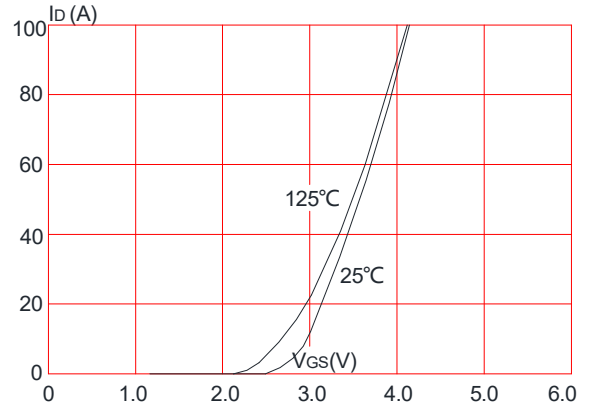


Figure 3: On-resistance vs. Drain Current

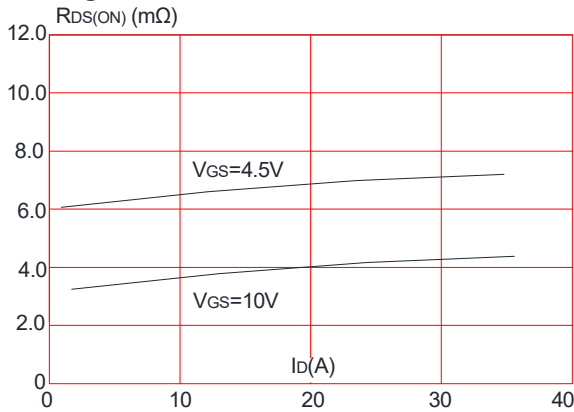


Figure 4: Body Diode Characteristics

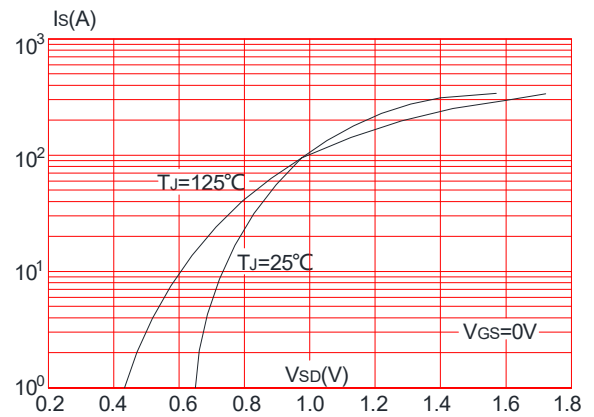


Figure 5: Gate Charge Characteristics

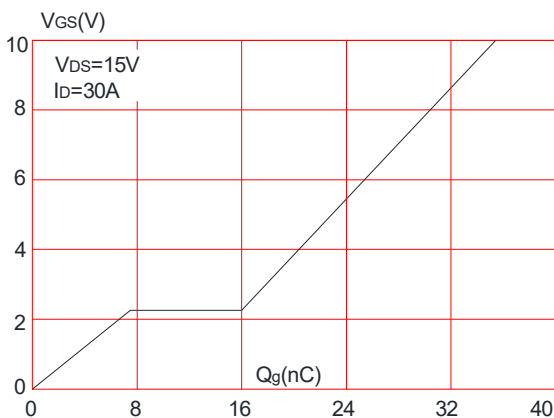


Figure 6: Capacitance Characteristics

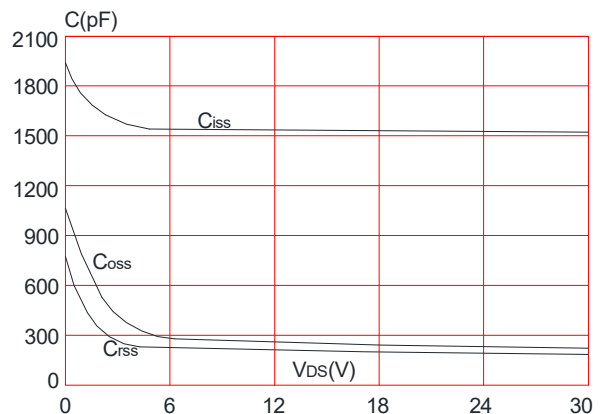




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

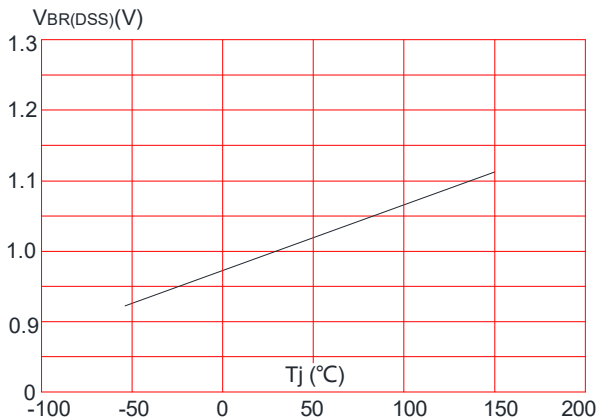


Figure 8: Normalized on Resistance vs. Junction Temperature

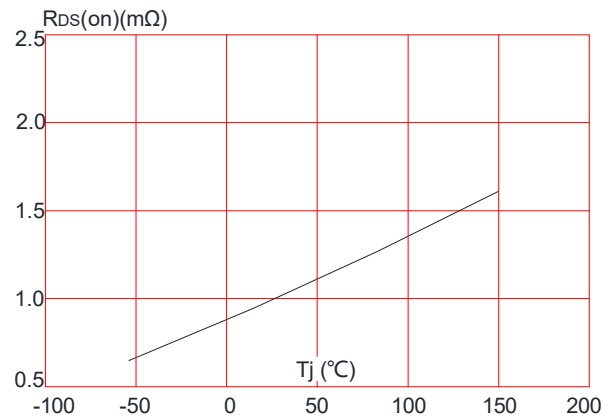


Figure 9: Maximum Safe Operating Area

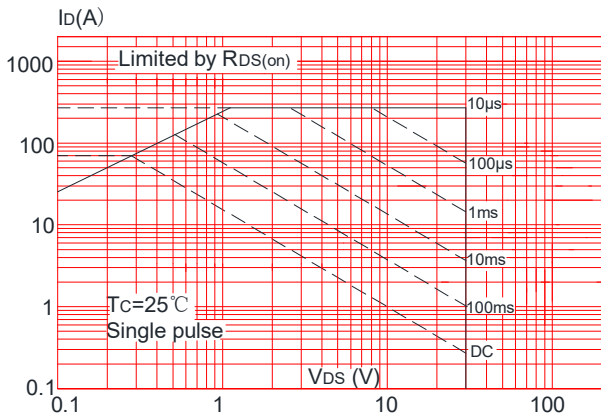


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

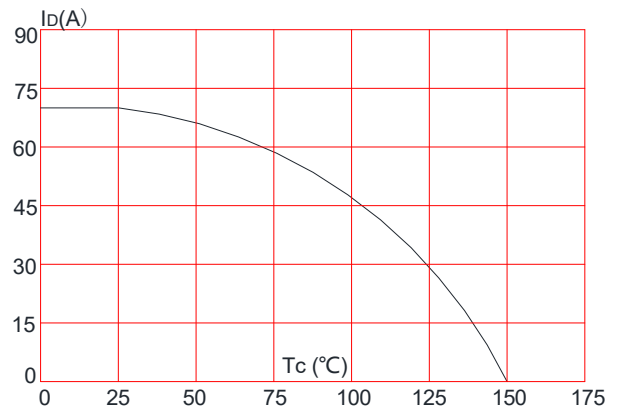
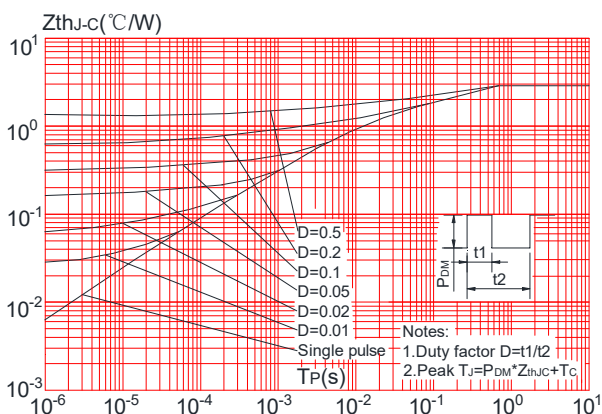


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





Test Circuit

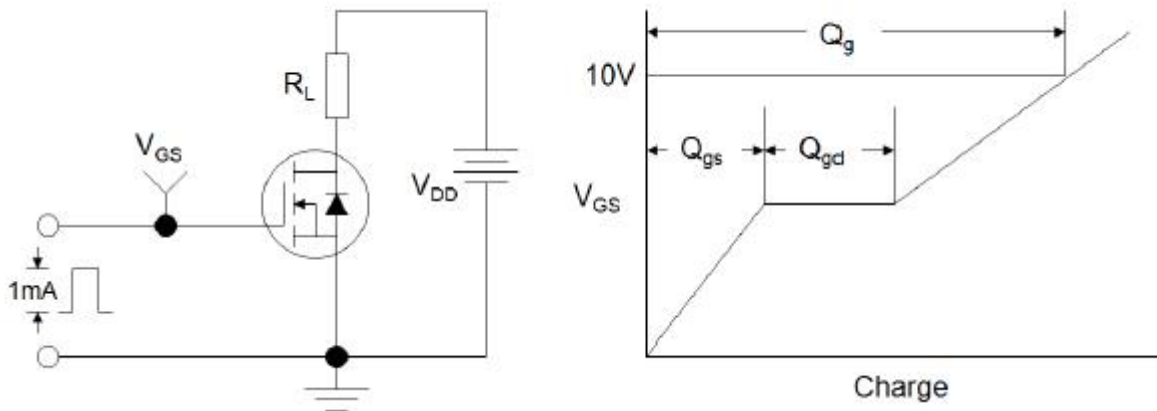


Figure1:Gate Charge Test Circuit & Waveform

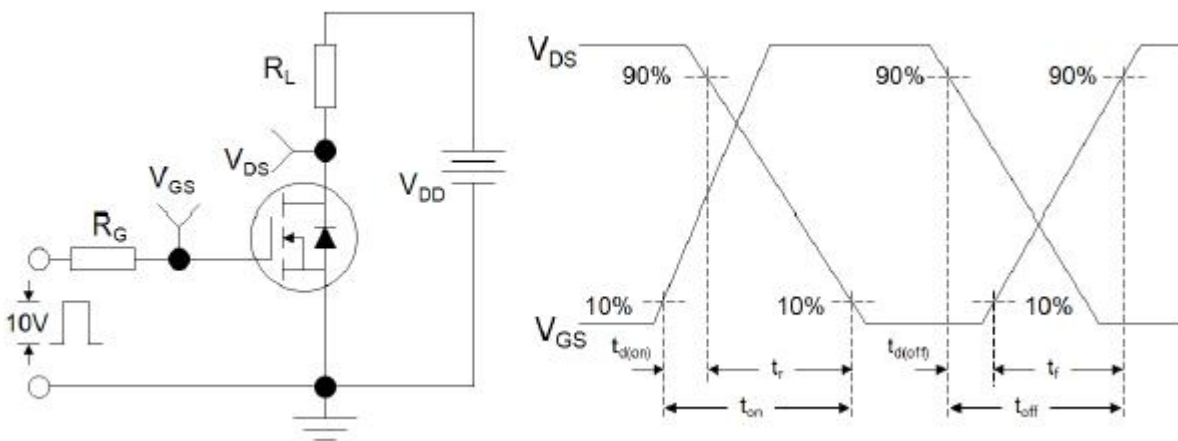


Figure 2: Resistive Switching Test Circuit & Waveforms

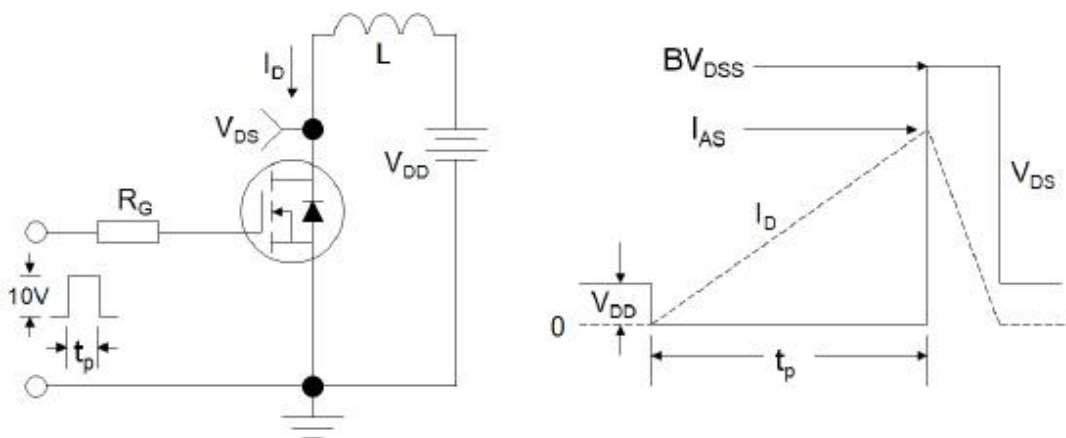
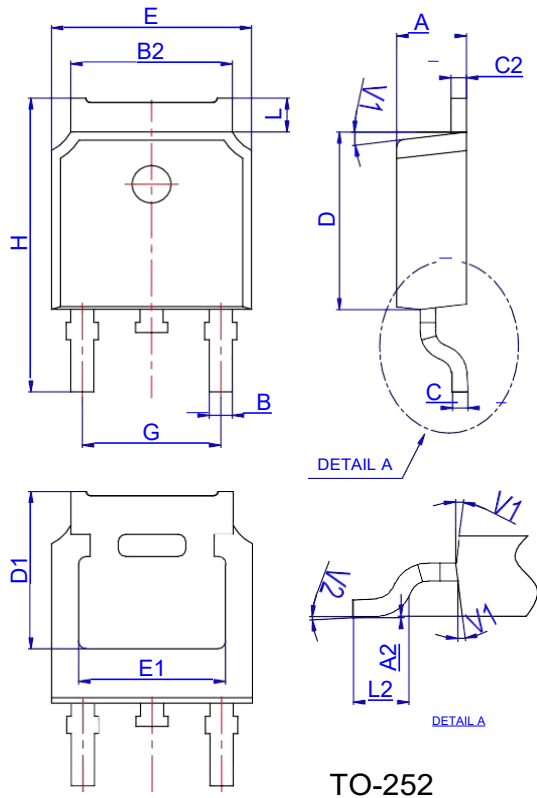


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



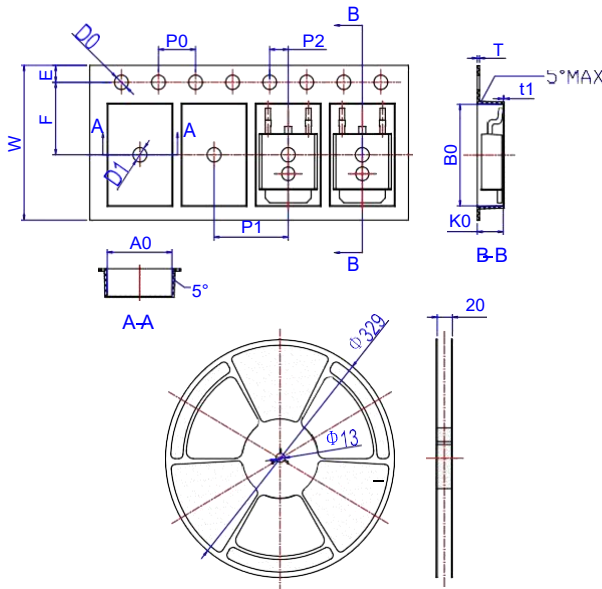
Package Mechanical Data TO 252



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583



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