

N-Channel Enhancement Mode Field Effect Transistor

Features

- 30V/55A
 $R_{DS(ON)} = 7m\Omega$ (Type) @ $V_{GS}=10V$
 $R_{DS(ON)} = 10.1m\Omega$ (Type) @ $V_{GS}=4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- TO-252 package

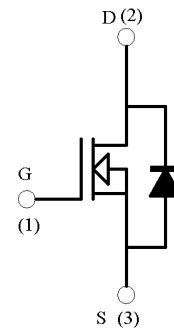
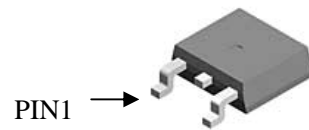


Lead Free and Green Devices Available
(ROHS Compliant)

Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered System.

Pin Description



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit	
V_{DSS}	Drain-to-Source Voltage	30	V	
V_{GSS}	Gate-to-Source Voltage	± 20	V	
I_D^*	Continuous Drain Current @ $T_J = 125^\circ C$	55	A	
I_{DM}^*	Pulsed Drain Current ($t_p \leq 10\mu s$)			
I_S^*	Diode Continuous Forward Current	1.25	A	
P_D^*	Total Power Dissipation	$T_A = 25^\circ C$	50	W
		$T_A = 100^\circ C$	25	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	$^\circ C$	
$R_{th JA}^*$	Thermal Resistance, Junction-to-Ambient	50	$^\circ C/W$	
T_L	Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	260	$^\circ C$	

Note: *Surface Mounted on 1in² pad area, $t \leq 10$ Secedes.

Electrical characteristics TCASE = 25 °C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
● states						
Drain-Source Breakdown Voltage	BVDSS	$V_{GS}=0V, I_{DS}=250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	1.5	1.8	2.5	V
Drain-Source On-state Resistance	$R_{DS(ON)(a)}$	$V_{GS}=10V, I_D=40A$		7	8.5	m Ω
		$V_{GS}=4.5V, I_D=20A$		10.1	11.5	
Diode Forward Voltage	VSD	$V_{GS}=0V, I_S=1.25A$		0.84	1.3	V
Forward Transconductance	gFS	$V_{GS}=7V, I_D=1A$		8		S
● Gate charge						
Total gate charge	Q_g	$V_{DS}=15V, I_D=1A, V_{GS}=10V$		26		nC
Gate-source charge	Q_{gs}			5		
Gate-Drain Charge	Q_{gd}			15		
● Dynamic (b)						
Input capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, f=1.0MHz$		2085		pF
Output capacitance	C_{oss}			1157		
Reverse transfer capacitance	C_{rss}			569		
● Switching times						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=15V, I_D=1A, V_{GEN}=10V, R_L=10\Omega, R_{GEN}=10\Omega$		17		ns
Rise Time	t_r			18		
Turn-Off Delay Time	$t_{D(OFF)}$			57		
Fall Time	t_f			33		

Notes

- (a). Surface Mounted on FR4 Board, $t \leq 10sec$
 (b). Pulse Test: Pulse Width $\leq 300\mu s$, Duty $\leq 2\%$
 (c). Guaranteed by design, not subject to production testing.

Figure 1. Output Characteristics

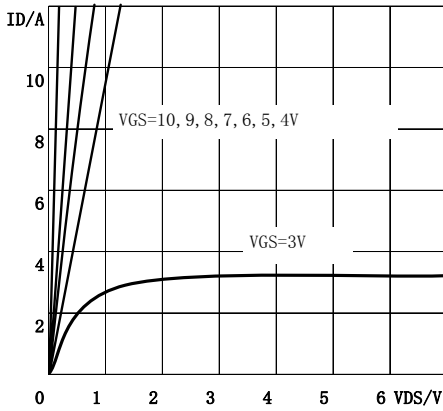


Figure 2. Transfer Characteristics

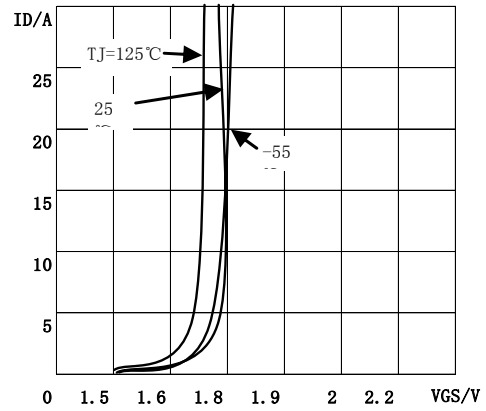


Figure 3. Capacitance variations

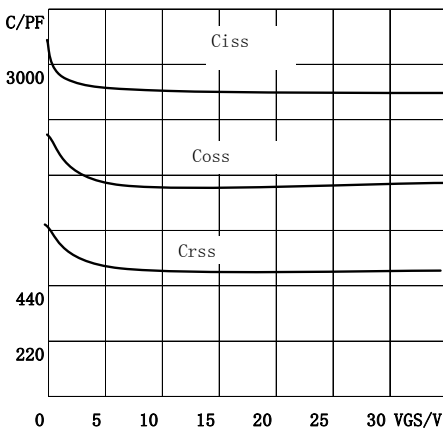


Figure 4. On-Resistance Variation with Temperature

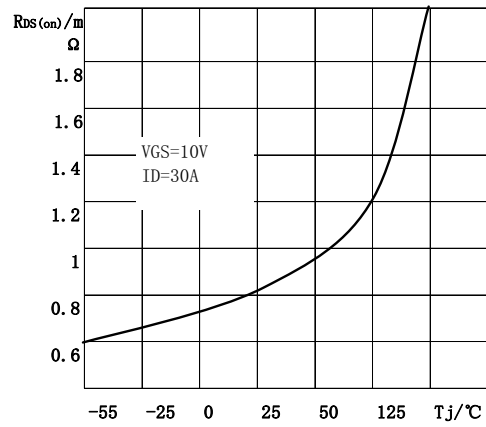


Figure 5. Gate Threshold Variation with Temperatures

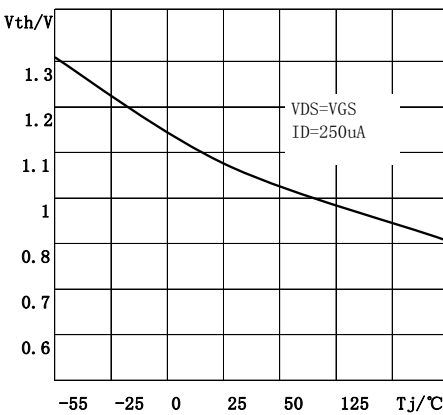


Figure 6. Breakdown Voltage Variation with temperatures

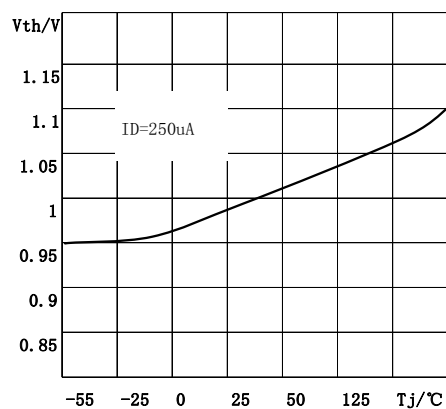


Figure7. Transconductance Variation With Drain Current

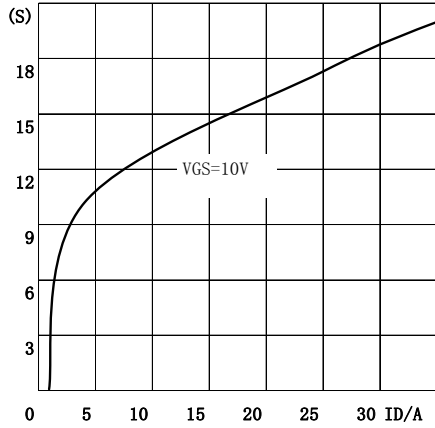


Figure8. Body Diode Forward Voltage Variation with Source Current

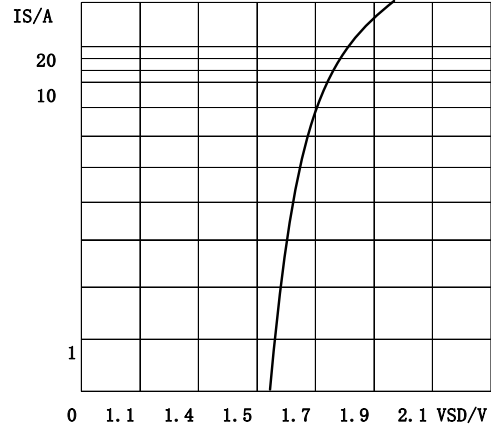


Figure9. Gate charge VS. Gate-source Voltage

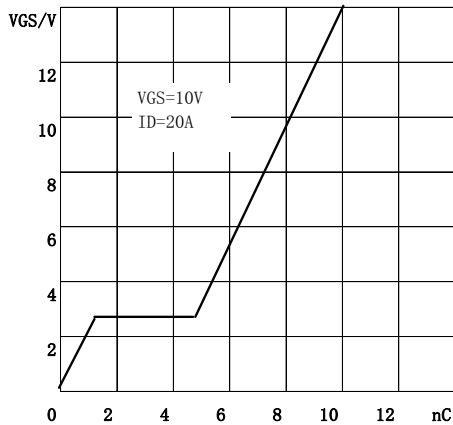


Figure10. Maximum Safe Operating Area

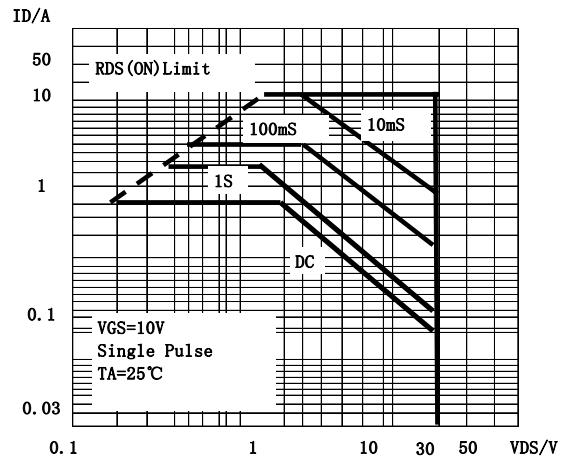


Figure 1. Switching times test circuit for Resistive load

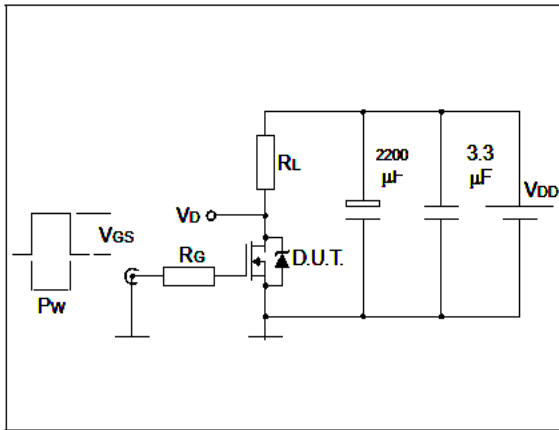


Figure 2. Gate charge test circuit

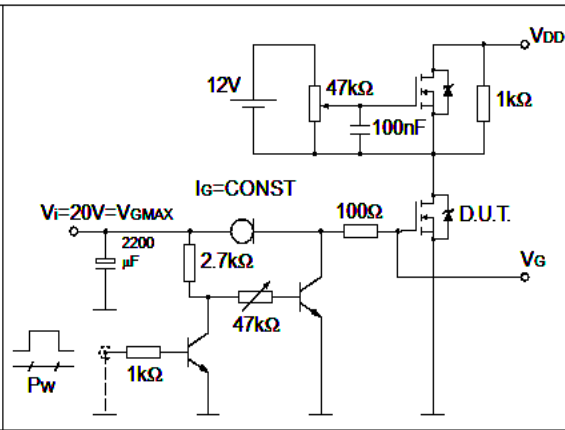


Figure 3. Test circuit for inductive load and diode recovery times

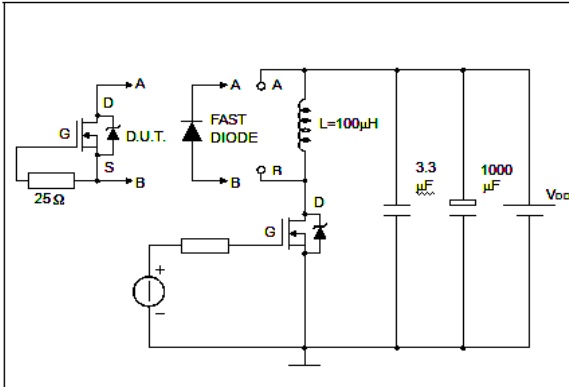


Figure 4. Unclamped Inductive load test circuit switching

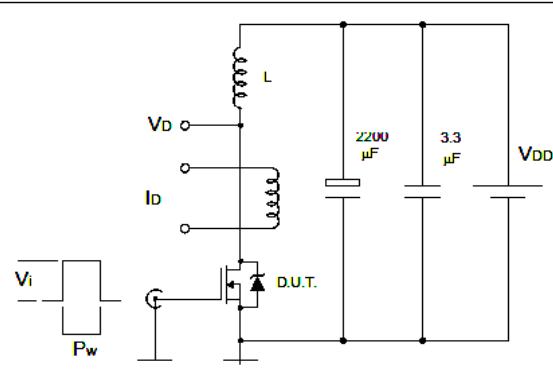


Figure 5. Unclamped inductive waveform

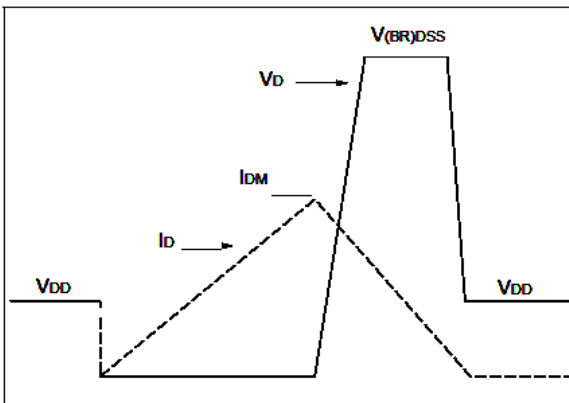
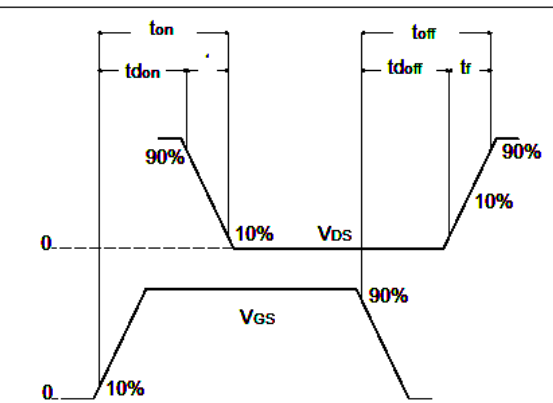
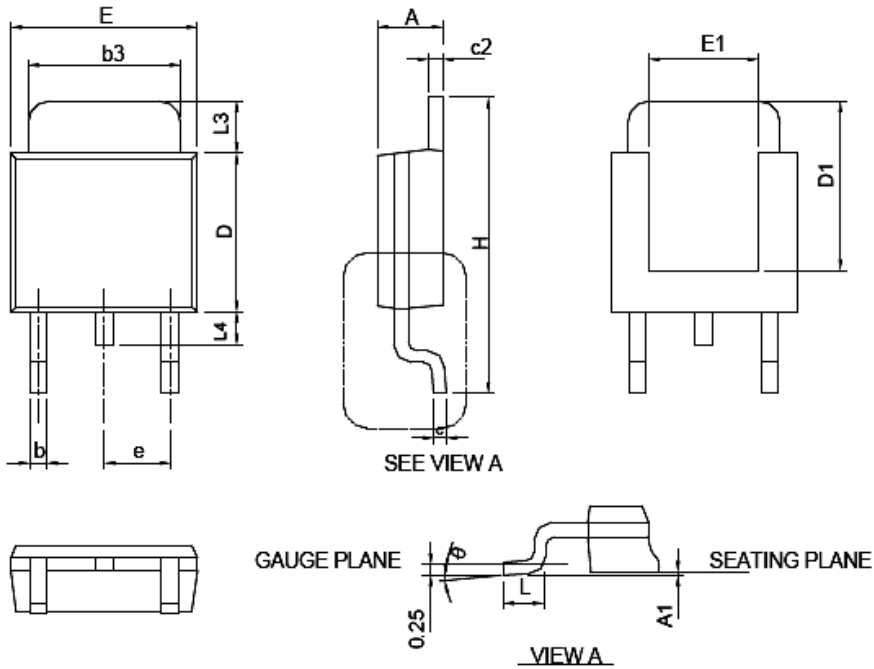


Figure 6. Switching time waveform



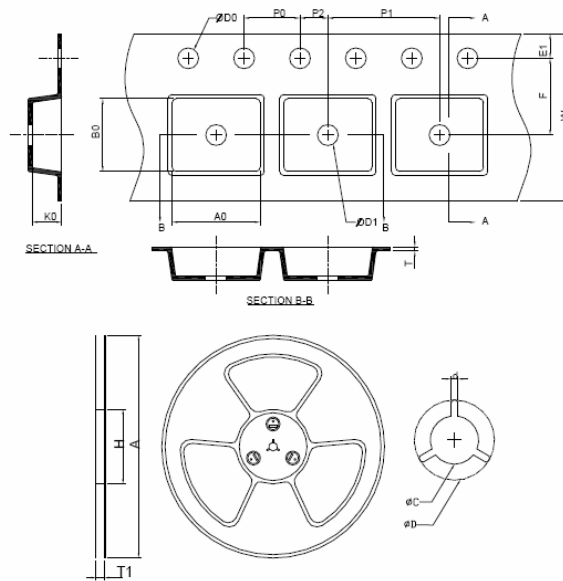


Package Information
TO-252



SYMBOL	TO-252			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1		0.13		0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4		1.02		0.040
0	0°	8°	0°	8°

Carrier Tape & Reel Dimensions



Application	A	H	T1	C	d	D	W	E1	F
TO-252	330.0±2.00	50 MIN	16.4+2.00 -0.00	13.0+0.50 -0.20	1.5MIN.	20.2MIN.	16.0±0.30	1.75±0.10	7.5±0.10
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.00±0.10	8.00±0.10	2.00±0.05	1.5+0.10 -0.00	1.5MIN.	0.6+0.05 -0.40	6.80±0.10	10.4±0.20	2.50±0.20

Devices per Unit

Package Type	UnitQuantity	Quantity
TO-252	Tape & Reel	2500