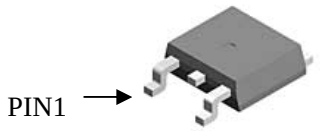
N-Channel Enhancement Mode Field Effect Transistor

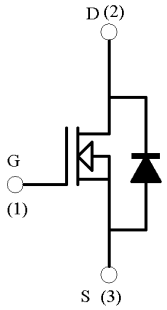
Features

- 60V/40A
  $R_{DS(ON)}$ = 20mΩ (Type) @ VGS=10V
  $R_{DS(ON)}$ = 28mΩ (Type) @ VGS=4.5V
- Super High Dense Cell Design
- Reliable and Rugged
- TO-252 package

Lead Free and Green Devices Available
(ROHS Compliant)

Pin Description





Applications

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

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

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-to-Source Voltage		60	V
V_{GSS}	Gate-to-Source Voltage		±20	V
I_D*	Continuous Drain Current@ T_J = 125℃	V_{GS}=10V	40	A
I_{DM}*	Pulsed Drain Current (tp ≤10us)		110	
I_S*	Diode Continuous Forward Current		1.25	A
P_D*	Total Power Dissipation	TA = 25℃	50	W
		TA = 100℃	25	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 150	℃
Rth JA*	Thermal Resistance, Junction-to-Ambient		50	℃/W
T_L	Maximum Lead Temperature for Soldering Purposes, 1/8″from case for 10 seconds		260	℃

Note: *Surface Mounted on 1in·1in $_{pad}$ area, t ≤ 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}=250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=48V, V_{GS}=0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	1.5	1.8	2.5	V
Drain-Source On-state Resistance	$R_{DS(ON)(a)}$	V_{GS}=10V,I_D=20A		20	22	mΩ
		V_{GS}=4.5V,I_D=10A		28	34	
Diode Forward Voltage	VSD	V_{GS}=0V,IS=1.25A		0.84	1.3	V
Forward Tran conductance	gFS	V_{GS}=7V,I_D=1A		5		S
● **Gate charge**						
Total gate charge	Q_g	V_{DS}=15V,I_D=1A , V_{GS}=10V		16		nC
Gate-source charge	Q_{gs}			2		
Input capacitance	Q_g			4		
● **Dynamic (b)**						
Input capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V f=1.0MHZ		1201		pF
Output capacitance	C_{oss}			121		
Reverse transfer capacitance	C_{rss}			70		
● **Switching times**						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD}=15V, I_D=1A, V_{GEN}=10V RL=10ohm , R_{GEN}=10ohm		11		ns
Rise Time	tr			9		
Turn-Off Delay Time	$t_{D(OFF)}$			56		
Fall Time	tf			27		

Notes

(a). Surface Mounted on FR4 Board, t≦10sec

(b). Pulse Test: Pulse Width≦300Us, Duty≦2%

(c). Guaranteed by design, not subject to production testing.

Figure 1.Output Characteristics

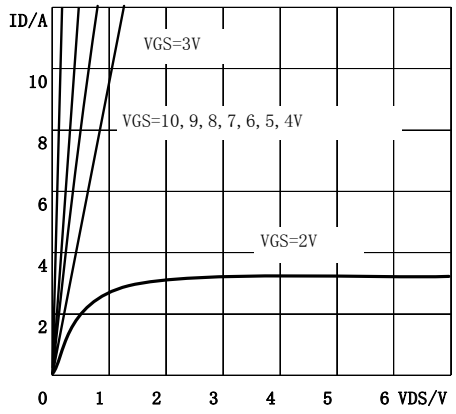


Figure 2.Transfer Characteristics

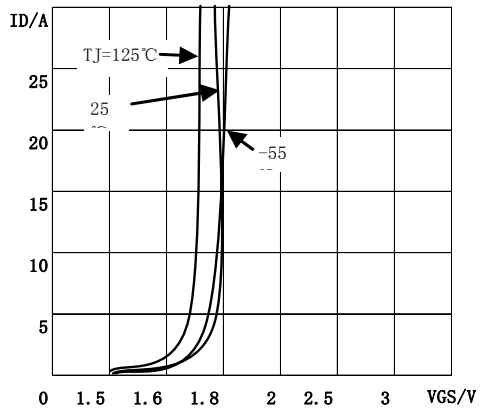


Figure3.Capacitance variations

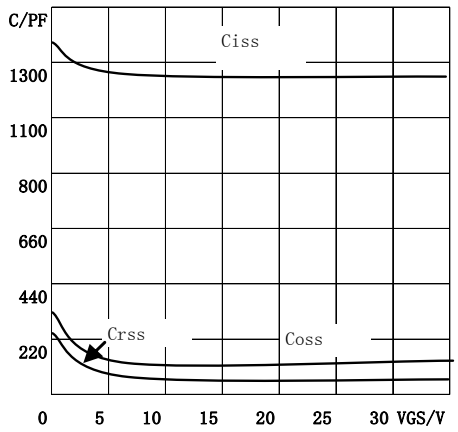


Figure4.On-Resistance Variation with Temperature

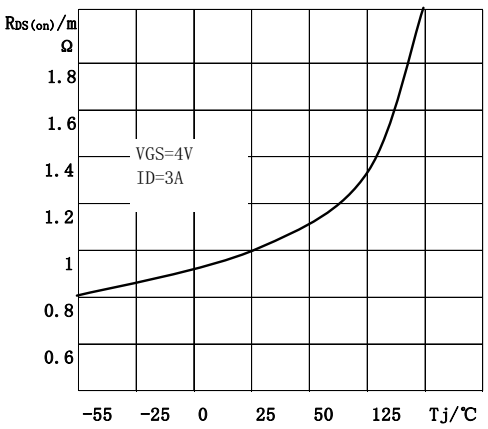


Figure5.Gate Threshold Variation with Temperatures

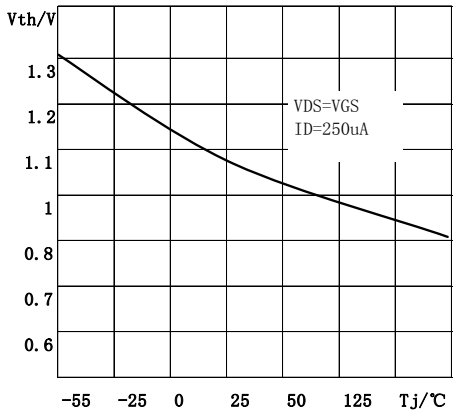


Figure6.Breakdown Voltage Variation with temperatures

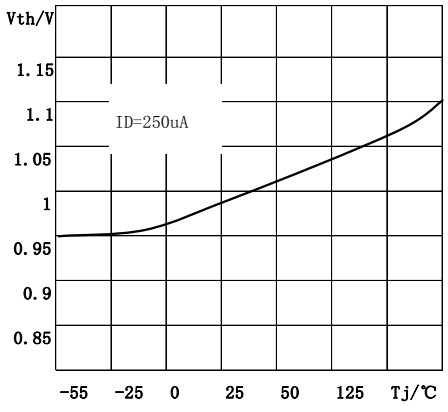


Figure7.Transconductance Variation With Drain Current

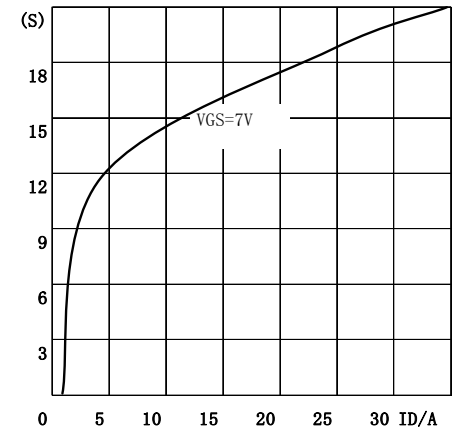


Figure8.Body Diode Forward Voltage Variation with Source Current

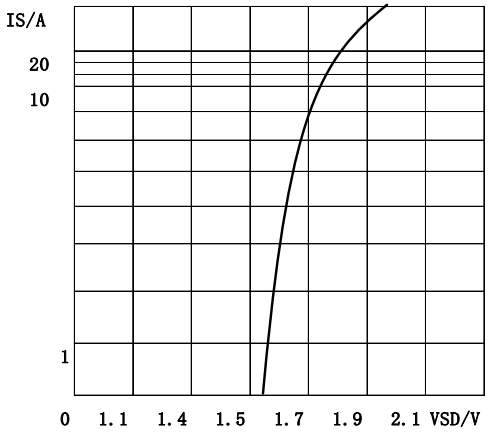


Figure9. Gate charge VS. Gate-source Voltage

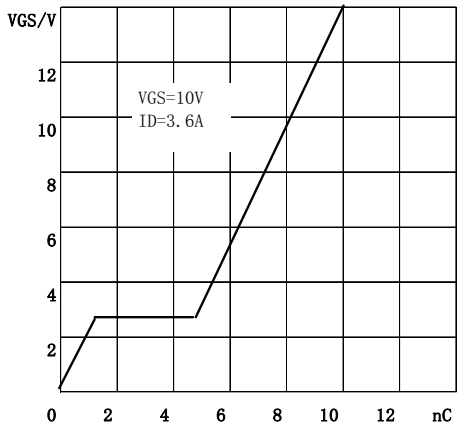


Figure10.Maximum Safe Operating Area

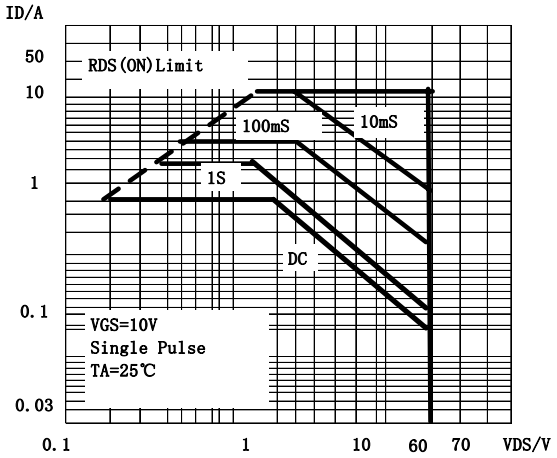


Figure 1. Switching times test circuit for Resistive load

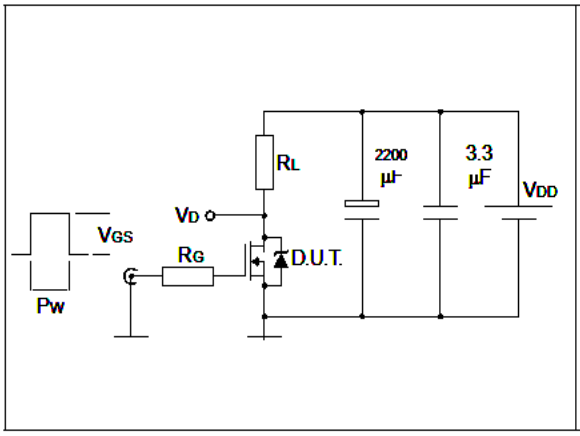


Figure 2. Gate charge test circuit

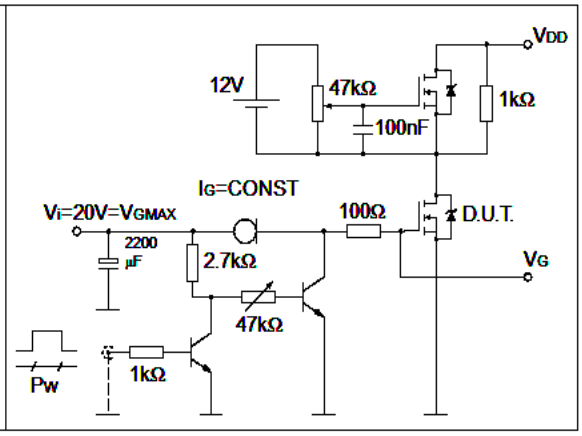


Figure 3. Test circuit for inductive load and diode recovery times

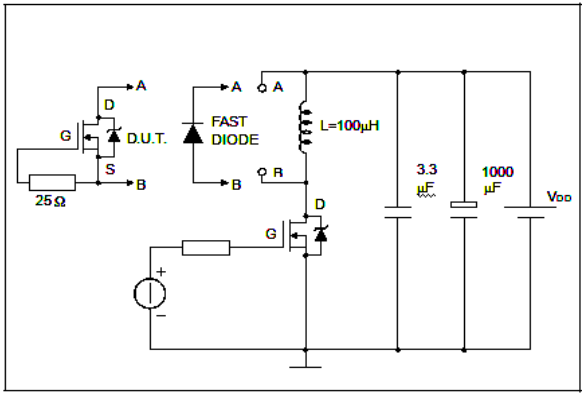


Figure 4. Unclamped Inductive load test circuit switching

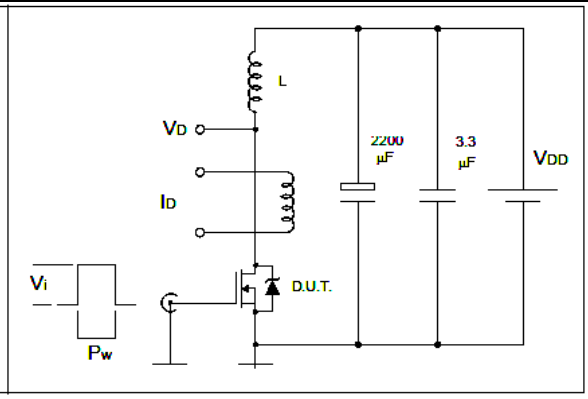


Figure 5. Unclamped inductive waveform

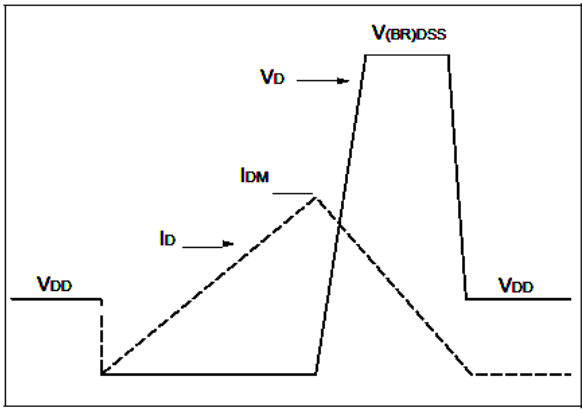
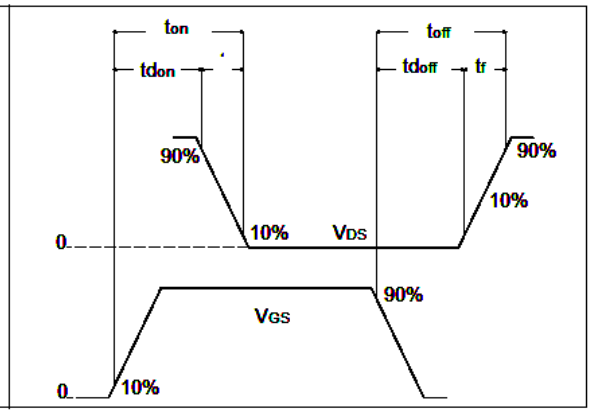
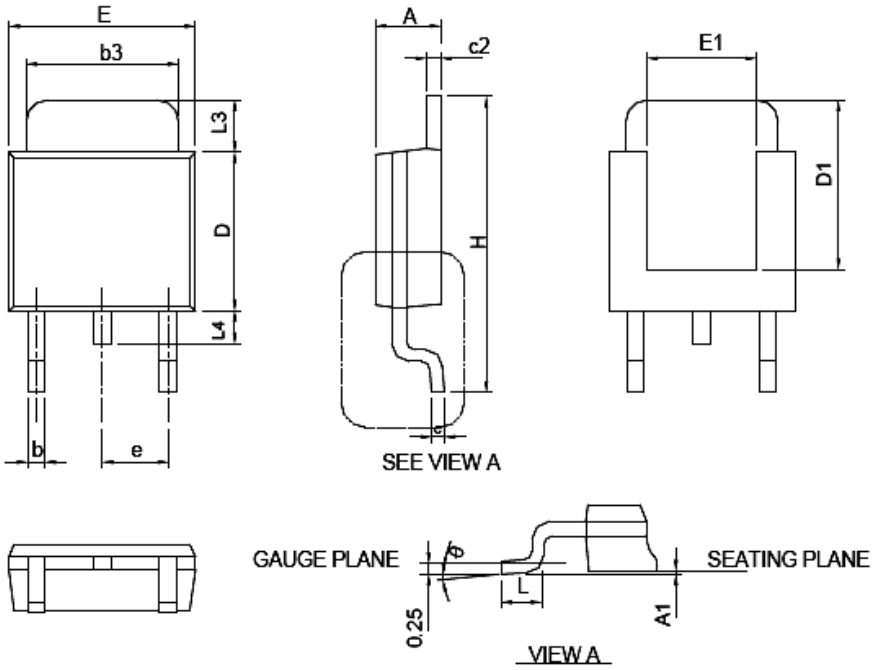


Figure 6.Switching time waveform



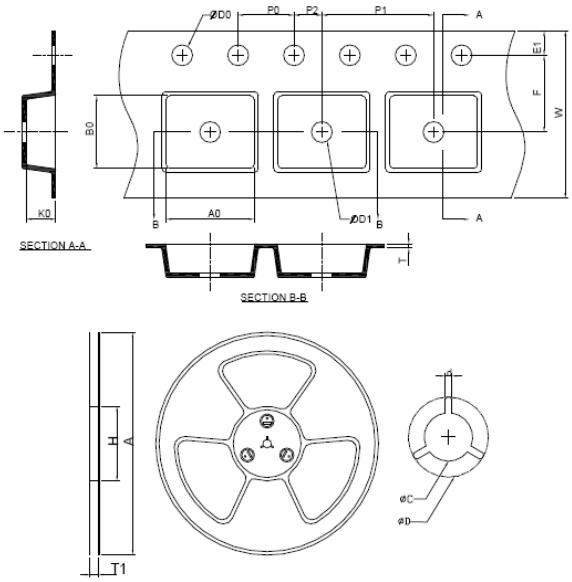
Package Information

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

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