



20V N-Channel Mosfet

FEATURES

- $R_{DS(ON)} \leq 6m\Omega$ (4.6m Ω Typ.)
@ $V_{GS}=4.5V$
- $R_{DS(ON)} \leq 8.8m\Omega$ (6.2m Ω Typ.)
@ $V_{GS}=2.5V$

APPLICATIONS

- Load Switch
- PWM Application
- Power management

MARKING



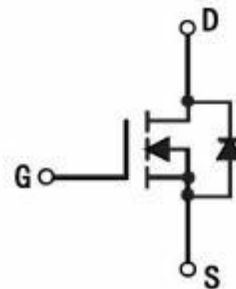
YYMM: Date Code(year&month)

TO-252



1: G
2: D
3: S

N-CHANNEL MOSFET

MAXIMUM RATINGS ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Max.	Units	
V_{DSS}	Drain-Source Voltage	20	V	
V_{GSS}	Gate-Source Voltage	± 12	V	
I_D	Continuous Drain Current	$T_c = 25 C$	60	A
		$T_c = 100 C$	39	A
I_{DM}	Pulsed Drain Current <small>note1</small>	240	A	
E_{AS}	Single Pulsed Avalanche Energy <small>note2</small>	120	mJ	
P_D	Power Dissipation	$T_c = 25 C$	34	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4.4	C/W	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	C	

ELECTRICAL CHARACTERISTICS $T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.65	1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=4.5V, I_D=20A$	-	4.6	6.0	m Ω
		$V_{GS}=2.5V, I_D=15A$	-	6.2	8.8	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V,$ $f=1.0MHz$	-	1935	-	pF
C_{oss}	Output Capacitance		-	478	-	pF
C_{rss}	Reverse Transfer Capacitance		-	194	-	pF
Q_g	Total Gate Charge	$V_{DS}=10V, I_D=20A,$ $V_{GS}=4.5V$	-	27	-	nC
Q_{gs}	Gate-Source Charge		-	6.5	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	6.2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=10V,$ $I_D=2A, R_{GEN}=3\Omega,$ $V_{GS}=4.5V$	-	6	-	ns
t_r	Turn-on Rise Time		-	17	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	28	-	ns
t_f	Turn-off Fall Time		-	15	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time		-	25	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$IF=20A,$ $di/dt=100A/\mu s$	-	20	-	nC

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=10V$, $V_G=4.5V$, $L=0.5mH$, $R_G=25\Omega$, $I_{AS}=22A$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



TYPICAL CHARACTERISTICS

Figure 1: Output Characteristics

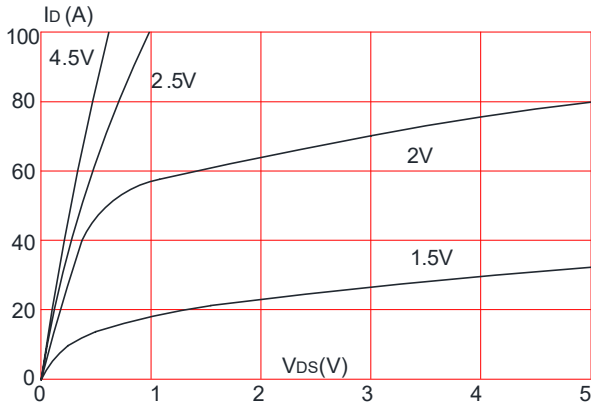


Figure 2: Typical Transfer Characteristics

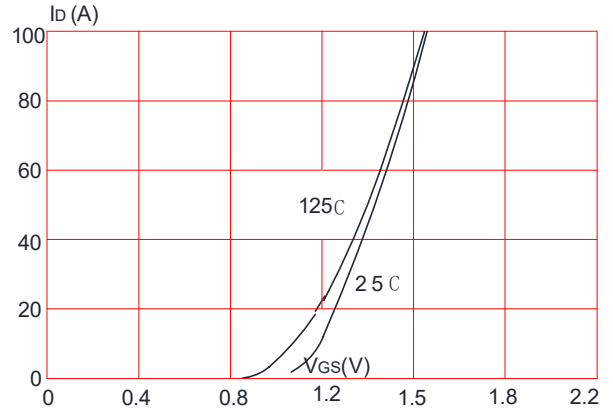


Figure 3: On-resistance vs. Drain Current

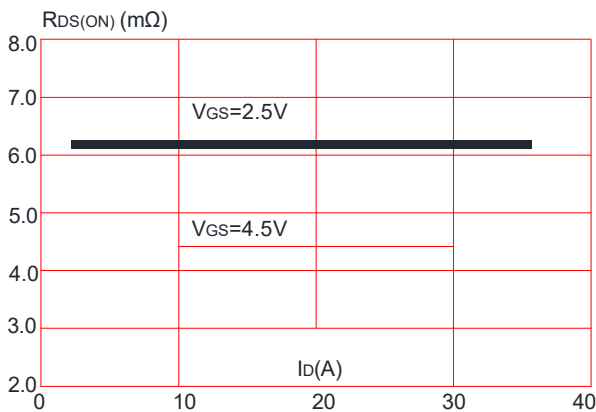


Figure 4: Body Diode Characteristics

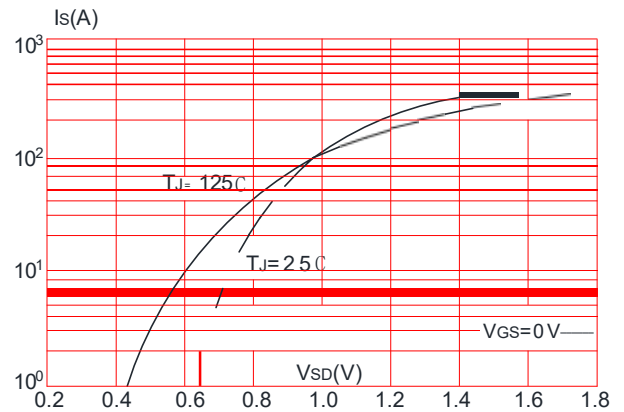


Figure 5: Gate Charge Characteristics

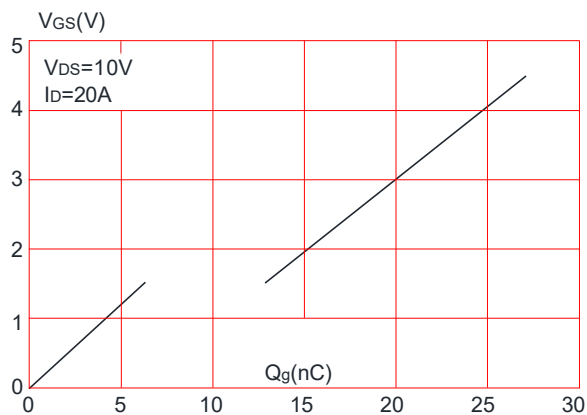
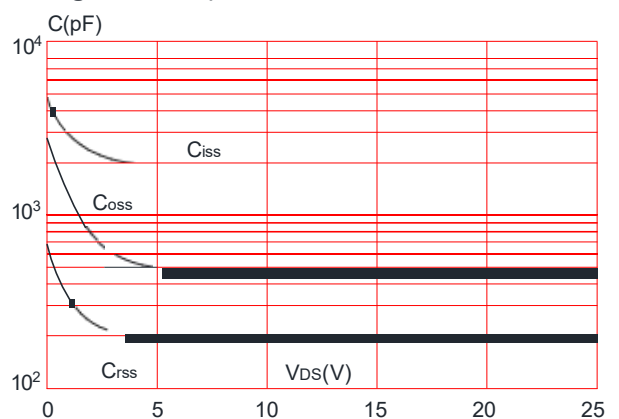


Figure 6: Capacitance Characteristics



TYPICAL CHARACTERISTICS (cont.)

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

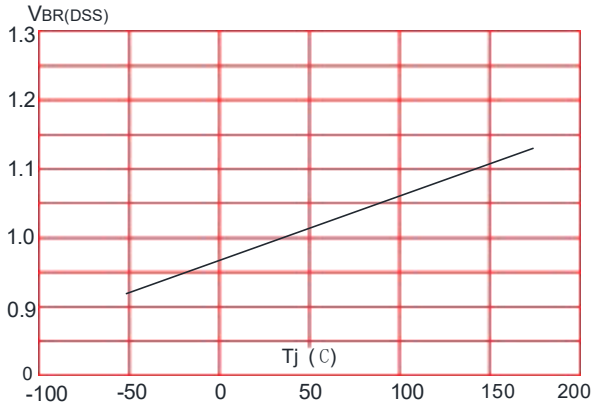


Figure 8: Normalized on Resistance vs. Junction Temperature

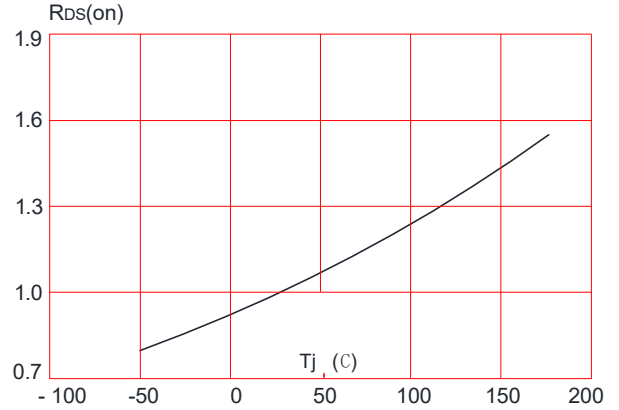


Figure 9: Maximum Safe Operating Area

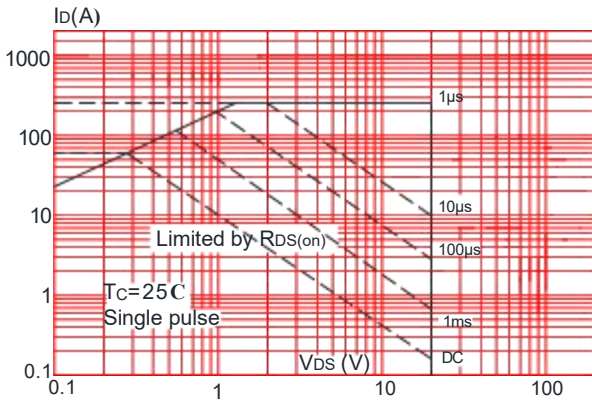


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

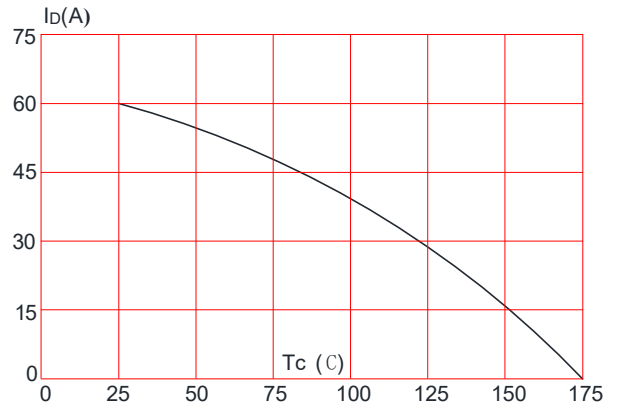
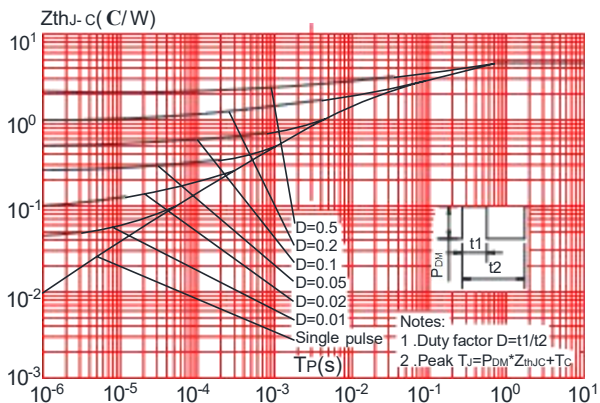
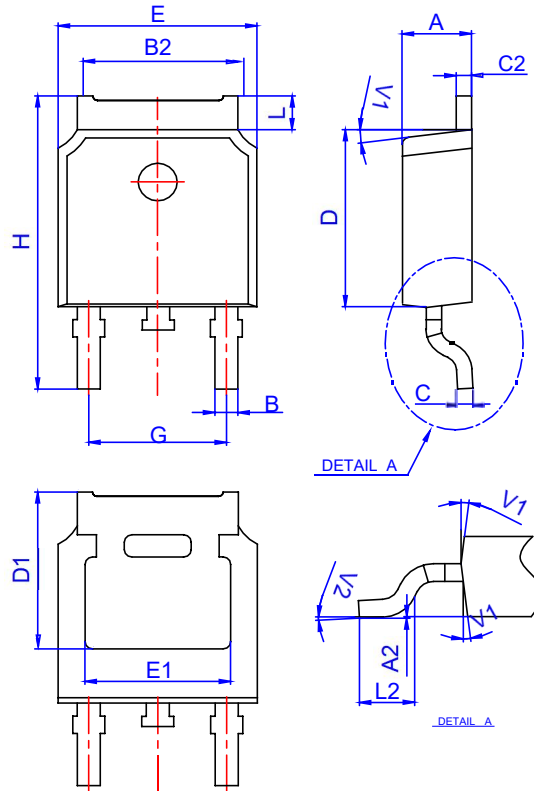


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





TO-252 PACKAGE OUTLINE DRAWING



Symbols	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°