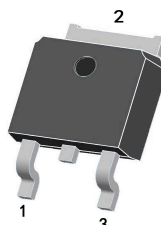


60V N-Channel Mosfet

FEATURES

- $R_{DS(ON)} \leq 3.7m\Omega$ (3.2m Ω Typ.)
@ $V_{GS}=10V$
- $R_{DS(ON)} \leq 4.7m\Omega$ (3.7m Ω Typ.)
@ $V_{GS}=4.5V$
- AEC Q101 qualified
- Green Product (RoHS compliant)

TO-252

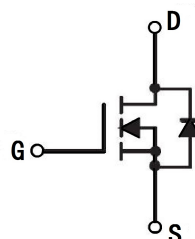


1. Gate
2. Drain
3. Source

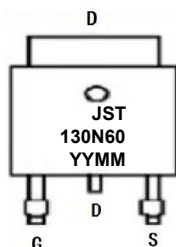
APPLICATIONS

- Automotive electronic pump
- Consumer electronic power supply
- Motor control
- Synchronous-rectification

N-CHANNEL MOSFET



MARKING



YYMM:Date Code(year & month)

MAXIMUM RATINGS ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Limit	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current @ $V_{GS}=10V$ <small>note1</small>	$T_C = 25^{\circ}C$	95
		$T_C = 100^{\circ}C$	67
I_{DM}	Pulsed Drain Current <small>note2</small>	315	A
E_{AS}	Single Pulsed Avalanche Energy <small>note3</small>	300	mJ
P_D	Power Dissipation <small>note4</small>	60	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.5	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <small>note5</small>	120	$^{\circ}C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS $T_C=25\text{ }^{\circ}\text{C}$ 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 = 250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 48V, V _{GS} = 0V T _J = 25°C	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = 250μA	1.0	-	3.0	V
R _{DS(ON)}	Gate Drain-Source On-State Resistance <small>note6</small>	V _{GS} =10V, I _D =20A	-	3.2	3.7	mΩ
		V _{GS} =4.5V, I _D =15A	-	3.7	4.7	
Dynamic Characteristics <small>note7</small>						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} = 0V, f = 1.0MHz	-	4894	-	pF
C _{oss}	Output Capacitance		-	2208	-	pF
C _{rss}	Reverse Transfer Capacitance		-	171	-	pF
Q _g	Total Gate Charge	V _{DS} =30V, I _D =25A, V _{GS} =10V	-	87.2	-	nC
Q _{gs}	Gate-Source Charge		-	10.7	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	10.9	-	nC
Switching Characteristics <small>note7</small>						
t _{d(on)}	Turn-On Delay Time	V _{GS} = 10V, V _{DS} =30V, R _G =2Ω, I _D =25A	-	22.5	-	ns
t _r	Turn-On Rise Time		-	33	-	ns
t _{d(off)}	Turn-Off Delay Time		-	80.3	-	ns
t _f	Turn-Off Fall Time		-	26.8	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _{SD} =20A, T _J = 25°C	-	-	1.3	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _s =25A,	-	70	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt =100A/μs	-	73	-	nC

Notes: 1. Calculated continuous current based on maximum allowable junction temperature.

2. Repetitive rating; pulse width limited by max. junction temperature.

3. $V_{DD}=30\text{ V}$, $R_G=25\text{ }\Omega$, $L=0.5\text{ mH}$, starting $T_J=25\text{ }^{\circ}\text{C}$.

4. P_d is based on max. junction temperature, using junction-case thermal resistance.

5. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz.Copper, in a still air environment with $T_J=25\text{ }^{\circ}\text{C}$.

6. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

7. Guaranteed by design, not subject to production testing

Typical Performance Characteristics

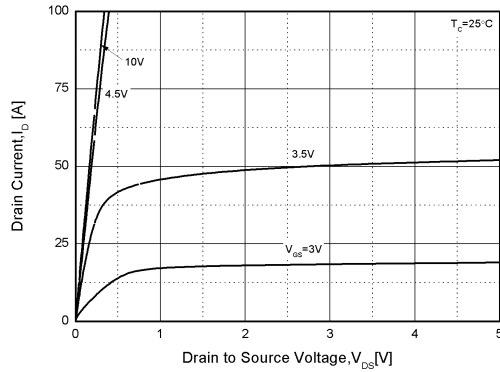


Figure1. Output Characteristics

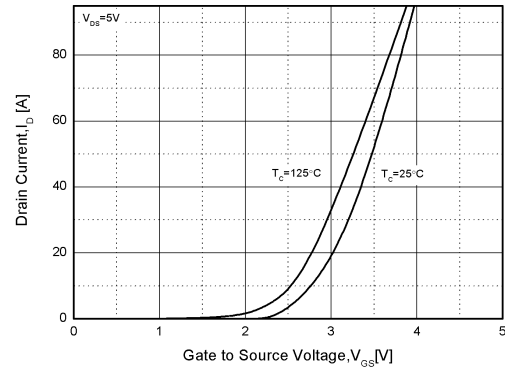


Figure2. Transfer Characteristics

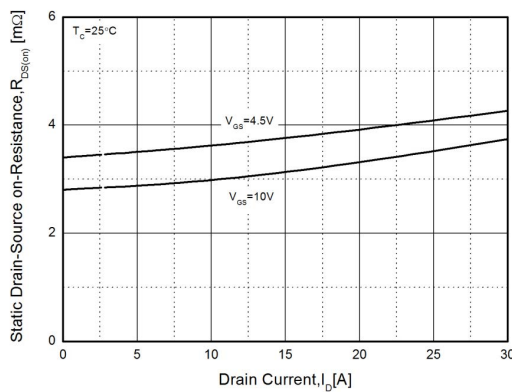


Figure3. Rdson-Drain Current

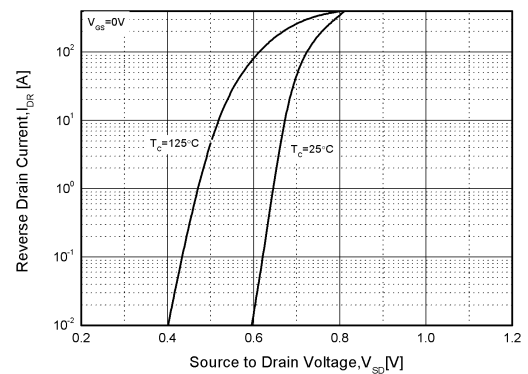


Figure4. Typical Source-Drain Diode Forward Voltage

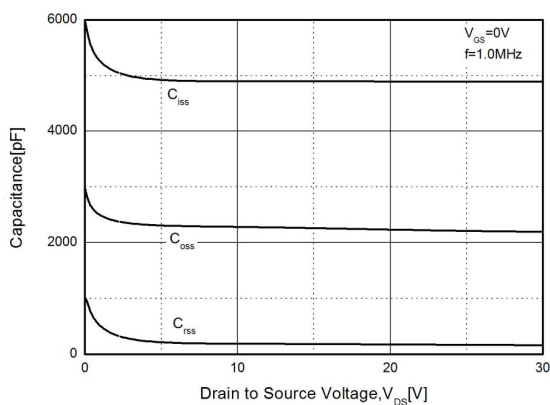


Figure5. Capacitance Characteristics

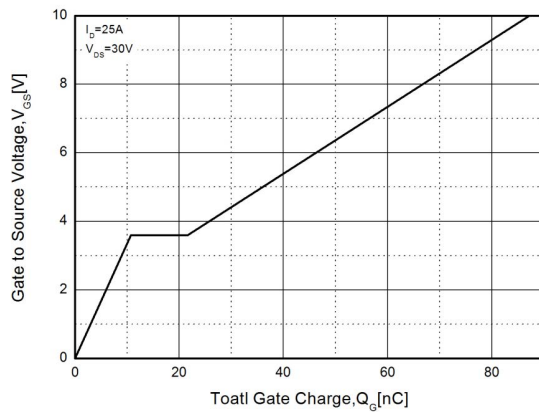


Figure6. Gate Charge

Typical Performance Characteristics (cont.)

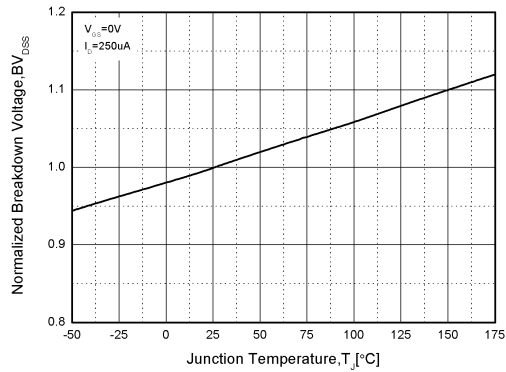


Figure7. Normalized Breakdown Voltage vs. Temperature

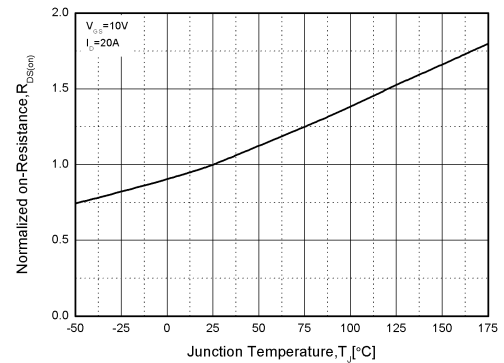


Figure8. Normalized on Resistance vs. Temperature

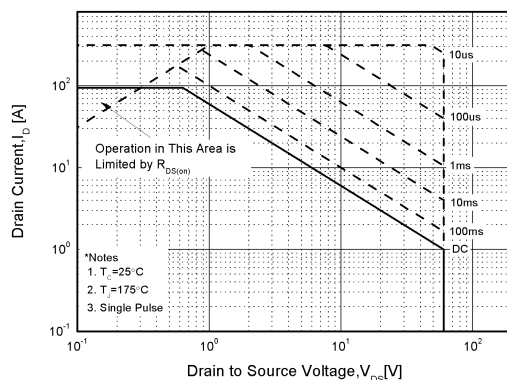


Figure9. Safe Operation Area

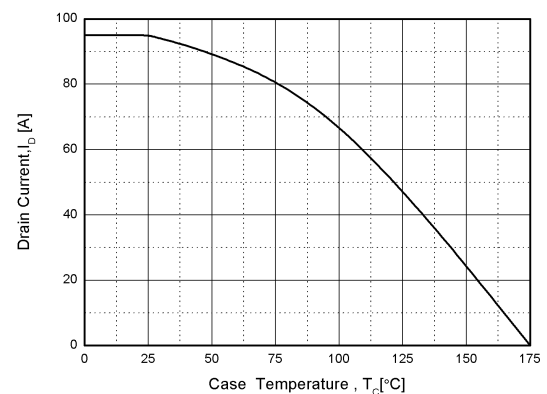


Figure10. Drain Current vs. Case Temperature

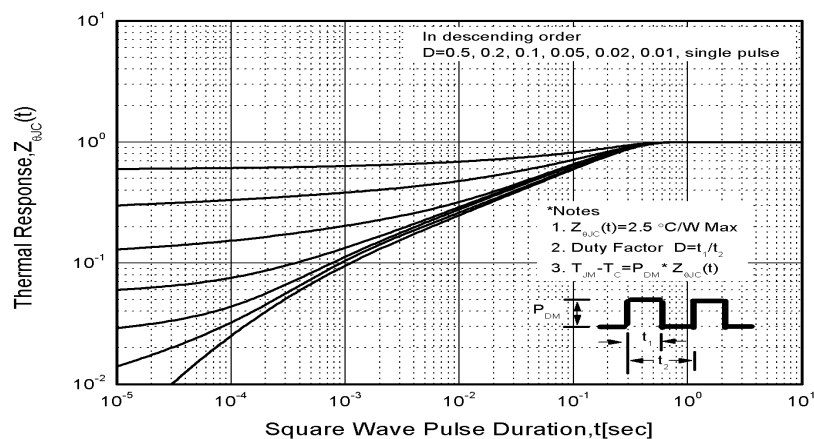
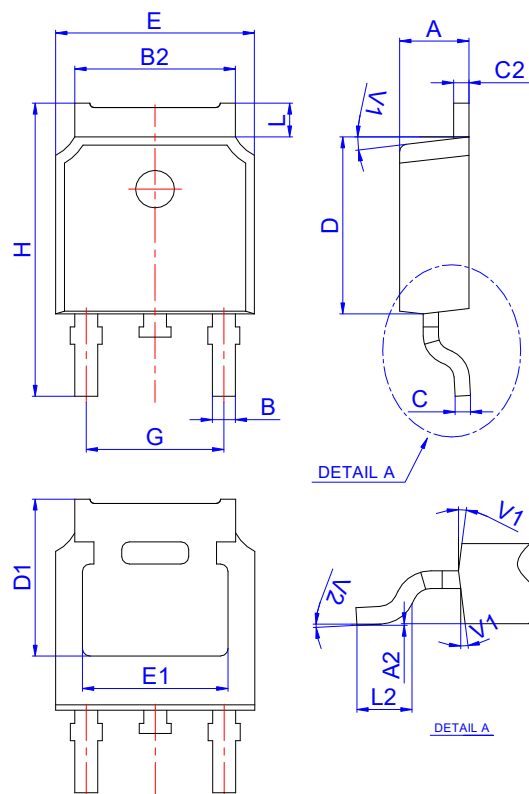


Figure11. Transient Thermal Response Curve

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°