

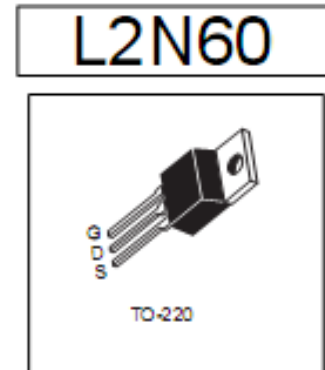
## N-Channel Enhancement Mode Field Effect Transistor

### 600V N-Channel Enhancement-Mode MOSFET

$V_{DS} = 600V$

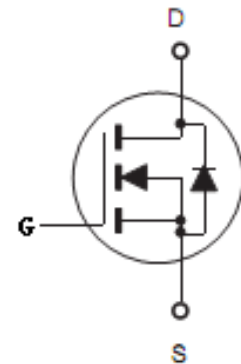
$R_{DS(ON)}, V_{GS}@10V, I_{DS}@1A = 3.8$

We declare that the material of product compliance with RoHS requirements.



### FEATURES

- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handing capability.
- Lead free product is acquired.
- TO-220 full-pak for through hole.



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous	$I_D$	2	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}^f$	6	A
Maximum Power Dissipation @ $T_C = 25^\circ C$ - Derate above $25^\circ C$	$P_D$	60	W
		0.48	W/ $^\circ C$
Single Pulsed Avalanche Energy <sup>d</sup>	$E_{AS}$	125	mJ
Repetitive Avalanche Current <sup>a</sup>	$I_{AR}$	2	A
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	5.4	mJ
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.1	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$

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## Electrical Characteristics $T_C = 25\text{ C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	600			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 600V, V_{GS} = 0V$			25	$\mu A$
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -30V, V_{DS} = 0V$			-100	nA
<b>On Characteristics<sup>b</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1A$		3.8	5.0	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 50V, I_D = 1A$		1.2		S
<b>Dynamic Characteristics<sup>c</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$		250		pF
Output Capacitance	$C_{oss}$			50		pF
Reverse Transfer Capacitance	$C_{rss}$			30		pF
<b>Switching Characteristics<sup>c</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 300V, I_D = 2A,$ $V_{GS} = 10V, R_{GEN} = 18\Omega$		18	35	ns
Turn-On Rise Time	$t_r$			18	35	ns
Turn-Off Delay Time	$t_{d(off)}$			50	90	ns
Turn-Off Fall Time	$t_f$			16	40	ns
Total Gate Charge	$Q_g$	$V_{DS} = 480V, I_D = 2A,$ $V_{GS} = 10V$		20	25	nC
Gate-Source Charge	$Q_{gs}$			2		nC
Gate-Drain Charge	$Q_{gd}$			12		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current	$I_S^g$				2	A
Drain-Source Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 2A^h$			1.5	V

**Notes :**

- a.Repetitive Rating : Pulse width limited by maximum junction temperature .  
 b.Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$  .  
 c.Guaranteed by design, not subject to production testing.  
 d.L = 60mH,  $I_{AS} = 2.0A$ ,  $V_{DD} = 50V$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ C$  .  
 e.Limited only by maximum temperature allowed .  
 f.Pulse width limited by safe operating area .  
 g.Full package  $I_{S(max)} = 1.5A$  .  
 h.Full package  $V_{SD}$  test condition  $I_S = 1.5A$  .

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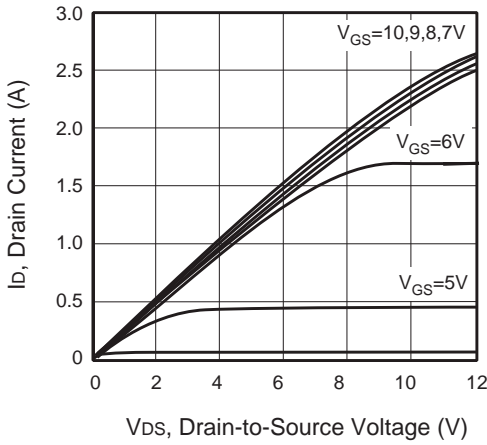


Figure 1. Output Characteristics

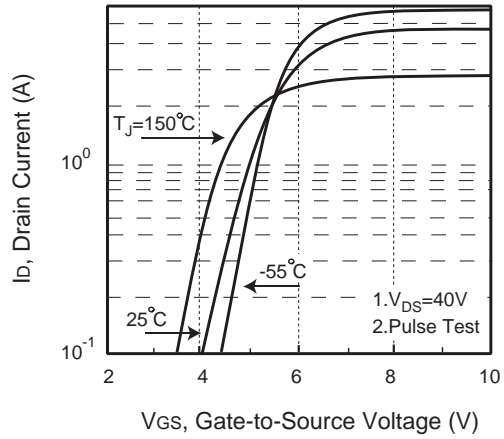


Figure 2. Transfer Characteristics

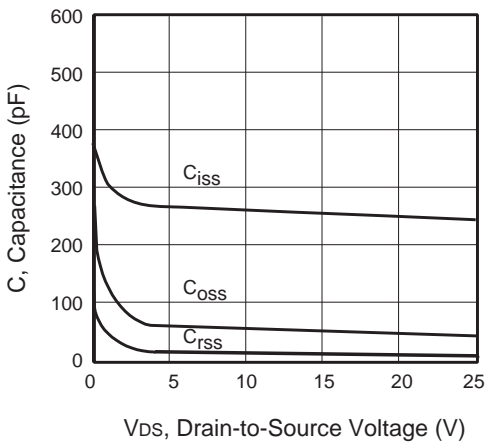


Figure 3. Capacitance

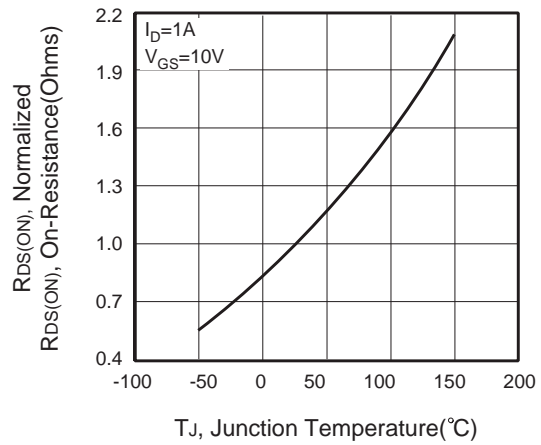


Figure 4. On-Resistance Variation with Temperature

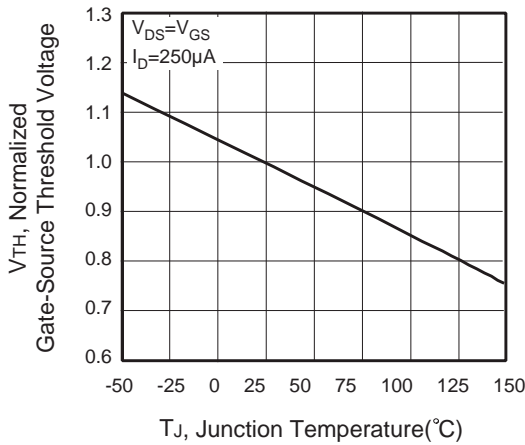


Figure 5. Gate Threshold Variation with Temperature

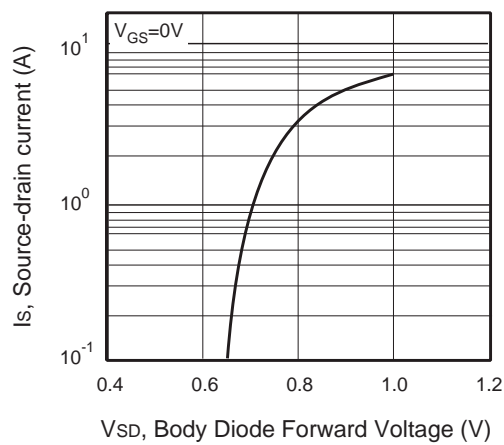


Figure 6. Body Diode Forward Voltage Variation with Source Current

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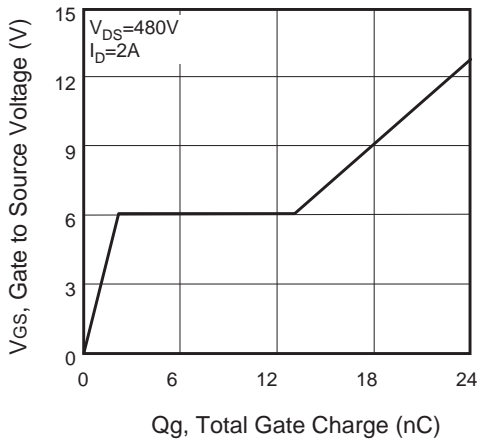


Figure 7. Gate Charge

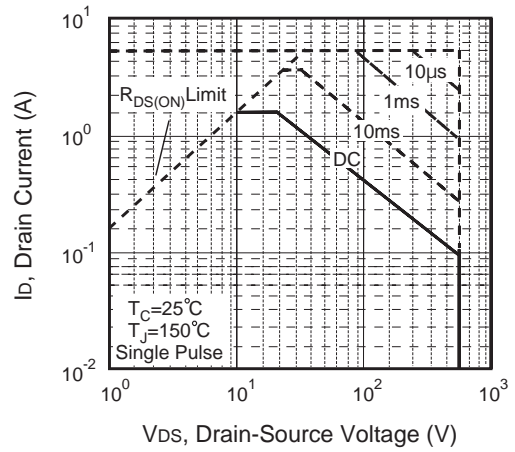


Figure 8. Maximum Safe Operating Area

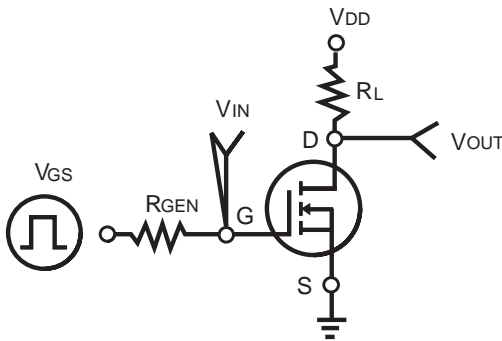


Figure 9. Switching Test Circuit

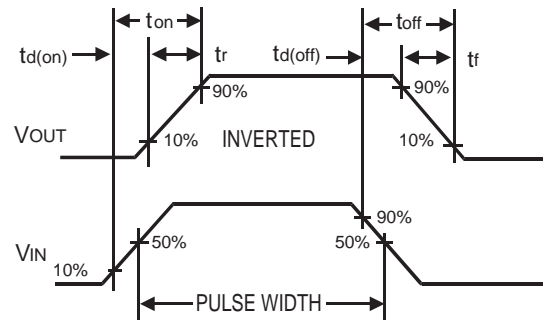


Figure 10. Switching Waveforms

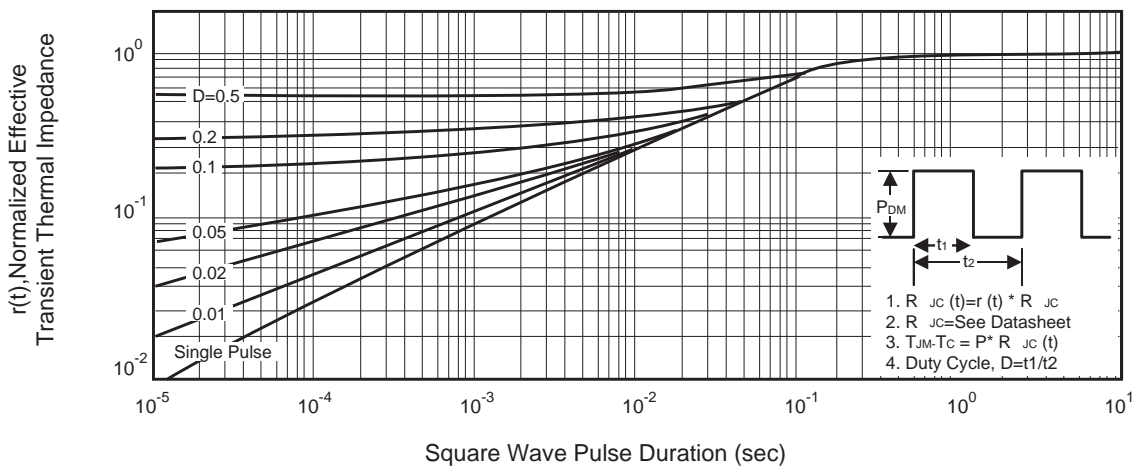
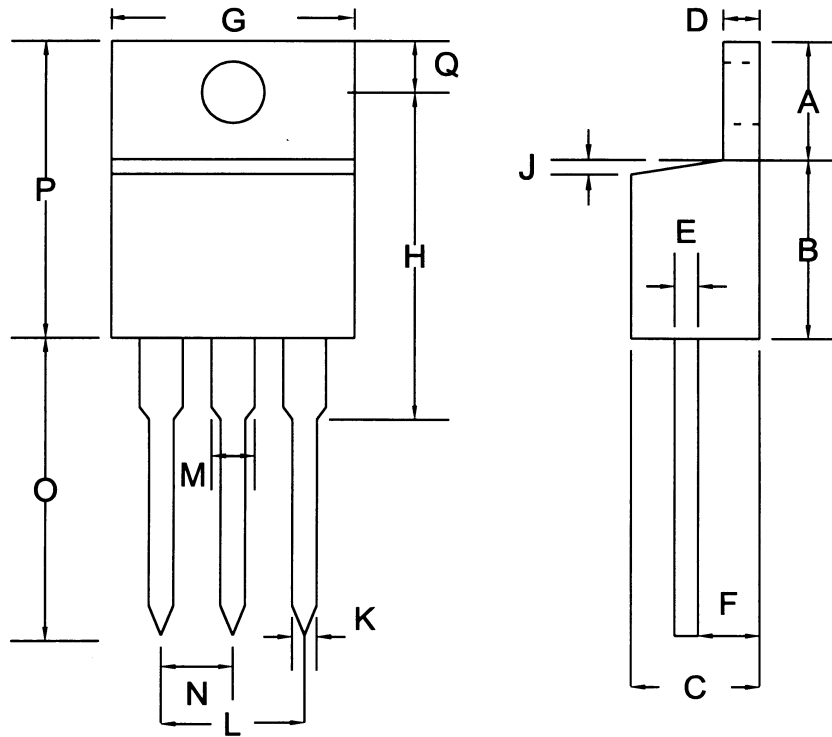


Figure 11. Normalized Thermal Transient Impedance Curve

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Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	5.58	6.54	7.49	0.220	0.257	0.295
B	8.38	8.64	8.90	0.330	0.340	0.350
C	4.07	4.45	4.82	0.160	0.175	0.190
D	1.15	1.27	1.39	0.045	0.050	0.055
E	0.35	0.45	0.60	0.014	0.018	0.024
F	2.04	2.42	2.79	0.080	0.095	0.110
G	9.66	9.97	10.28	0.380	0.393	0.405
H	—	16.25	—	—	0.640	—
I	3.68	3.83	3.98	0.145	0.151	0.157
J	—	—	1.27	—	—	0.050
K	0.75	0.85	0.95	0.030	0.033	0.037
L	4.83	5.08	5.33	0.190	0.200	0.210
M	1.15	1.33	1.52	0.045	0.052	0.060
N	2.42	2.54	2.66	0.095	0.100	0.105
O	12.70	13.48	14.27	0.500	0.531	0.562
P	14.48	15.17	15.87	0.570	0.597	0.625
Q	2.54	2.79	3.04	0.100	0.110	0.120