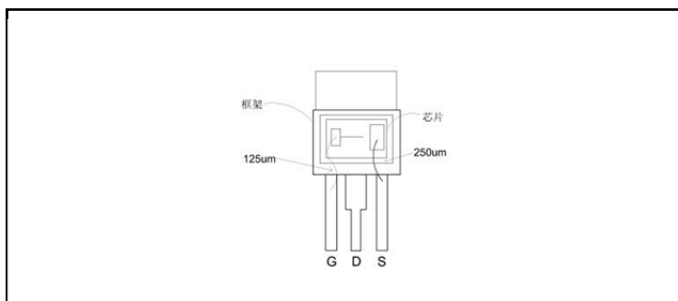
**Feature:**

- Low Crss
- Low Gate Charge
- Fast Switching
- Improved ESD Capability
- Improved dv/dt Capability
- 100% Avalanche Energy Test

**Mechanical Data:**

- **Package: MOS**  
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant
- **Terminal: Tin plated leads,**  
Solderable per J-STD-002 and JESD22-B102
- **Polarity:** As marked on body

**Ordering Information**

P/N	PACKAGE	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
LM2N60CP	TO-252	F1	Approximate 0.4	2500	5000	25000	

■ **Maximum Ratings** ( $T_a=25^\circ\text{C}$  Unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	600	V
Continues Drain Current	$I_D$	$T_c=25^\circ\text{C}$	2*
		$T_c=100^\circ\text{C}$	1.3*
Plused Drain Current (note 1)	$I_{DM}$	8	A
Gate-to-Source Voltage	$V_{GS}$	$\pm 30$	V
Single Pulsed Avalanche Energy (note 2)	$E_{AS}$	120	mJ
Avalanche Current (note 1)	$I_{AR}$	2.0	A
Repetitive Avalanche Energy (note 1)	$E_{AR}$	10	mJ
Peak Diode Recovery (note 3)	dv/dt	4.5	V/ns
Power Dissipation	$P_D$ $T_c=25^\circ\text{C}$	TO-220AB	54
		ITO-220AB	23
		TO-251/TO-252	44
Power Dissipation Derating Factor	$P_{D(DF)}$ Above $25^\circ\text{C}$	TO-220AB	0.8
		ITO-220AB	0.26
		TO-251/TO-252	0.39
Operating and Storage Temperature Range	$T_J, T_{STG}$	150, $-55 \sim +150$	$^\circ\text{C}$
Maximum Temperature for Soldering	$T_L$	300	$^\circ\text{C}$

■ **Electrical Characteristics** ( $T_a=25^\circ\text{C}$  Unless otherwise specified)

Off-Characteristics						
Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	600	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu\text{A}$ , referenced to $25^\circ\text{C}$	-	0.7	-	$\text{V}/^\circ\text{C}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=600\text{V}, V_{GS}=0\text{V}, T_c=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{DS}=480\text{V}, T_c=125^\circ\text{C}$	-	-	10	
Gate-body leakage current, forward	$I_{GSSF}$	$V_{DS}=0\text{V}, V_{GS}=30\text{V}$	-	-	100	nA
Gate-body leakage current, reverse	$I_{GSSR}$	$V_{DS}=0\text{V}, V_{GS}=-30\text{V}$	-	-	-100	nA

## On-Characteristics

Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1.0A$	-	3.5	4.5	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 40V, I_D = 1.0A$ (note4)	-	2.0	-	S

## Dynamic Characteristics

Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Input capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	380	480	pF
Output capacitance	$C_{oss}$		-	40	52	pF
Reverse transfer capacitance	$C_{rss}$		-	6	8	pF

## Switching Characteristics

Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Turn-On delay time	$t_d(on)$	$V_{DD} = 300V, I_D = 2A, R_G = 25\Omega$ (note 4, 5)	-	16	40	ns
Turn-On rise time	$t_r$		-	50	110	ns
Turn-Off delay time	$t_d(off)$		-	40	80	ns
Turn-Off Fall time	$t_f$		-	45	95	ns
Total Gate Charge	$Q_g$	$V_{DS} = 480V, I_D = 2A, V_{GS} = 10V$ (note 4, 5)	-	10	14	nC
Gate-Source charge	$Q_{gs}$		-	2.1	-	nC
Gate-Drain charge	$Q_{gd}$		-	5.5	-	nC

## Drain-Source Diode Characteristics and Maximum Ratings

Parameter	Symbol	Tests Conditions	Min	Type	Max	Unit
Maximum Continuous Drain-Source Diode Forward Current		$I_S$	-	-	2	A
Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$	-	-	8	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 2A$	-	-	1.4	V
Reverse recovery time	$t_{rr}$	$V_{GS} = 0V, I_S = 2A$ $di_F/dt = 100A/\mu s$ (note 4)	-	260	-	ns
Reverse recovery charge	$Q_{rr}$		-	1.2	-	$\mu C$

## ■ Thermal Characteristics (T<sub>a</sub>=25°C Unless otherwise specified)

Parameter	Symbol		Max	Unit
Thermal Resistance, Junction to Case	Rth(j-c)	TO-220AB	2.32	°C/W
		ITO-220AB	5.5	
		TO-251/TO-252	2.87	
Thermal Resistance, Junction to Ambient	Rth(j-A)	TO-220AB	62.5	°C/W
		ITO-220AB	62.5	
		TO-251/TO-252	110	

\* Drain current limited by maximum junction temperature

Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: L=55mH, I<sub>AS</sub>=2A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C
- 3: I<sub>SD</sub> ≤ 2A, di/dt ≤ 300A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub>=25°C
- 4: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
- 5: Essentially independent of operating temperature

## ■ Characteristics (Typical)

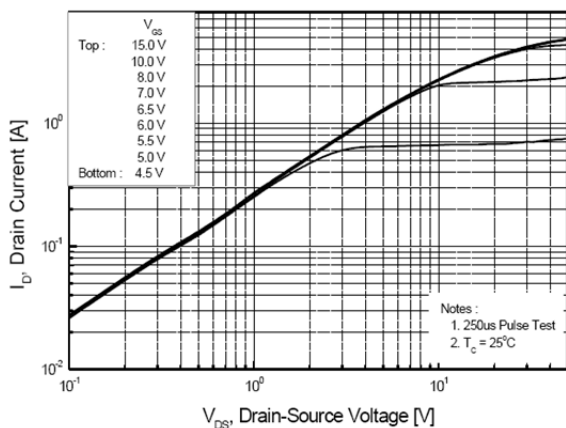


Fig. 1 On-State Characteristics

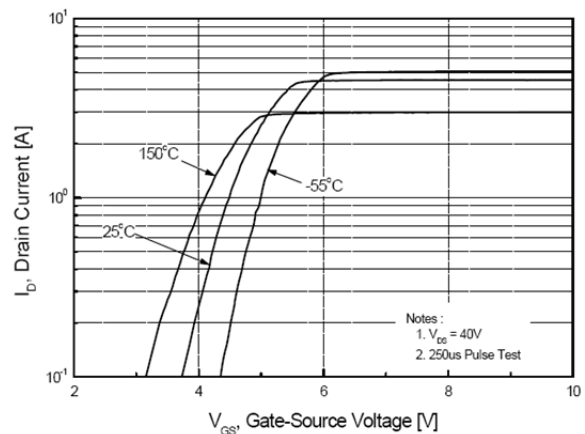


Fig. 2 Transfer Characteristics

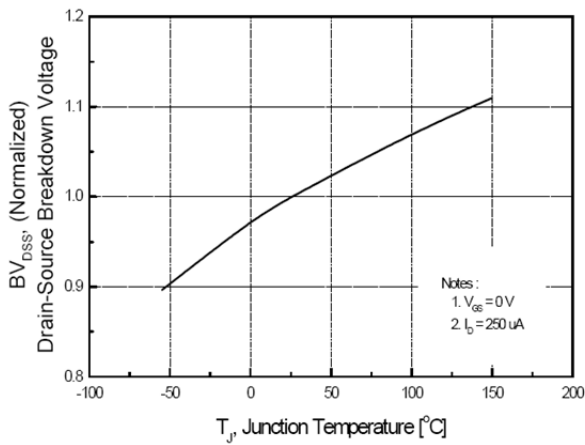


Fig. 3 Breakdown Voltage Variation vs Temperature

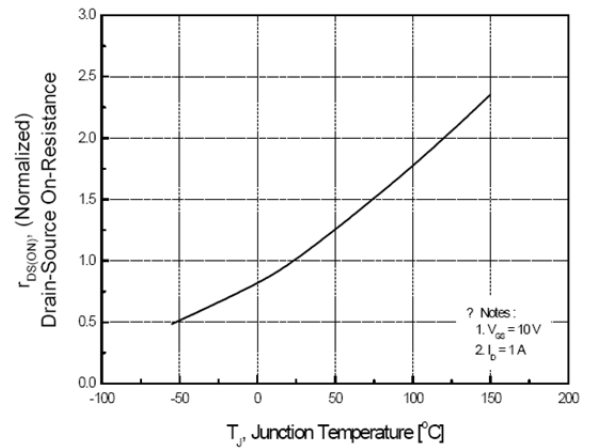


Fig. 4 On-Resistance Variation vs Temperature

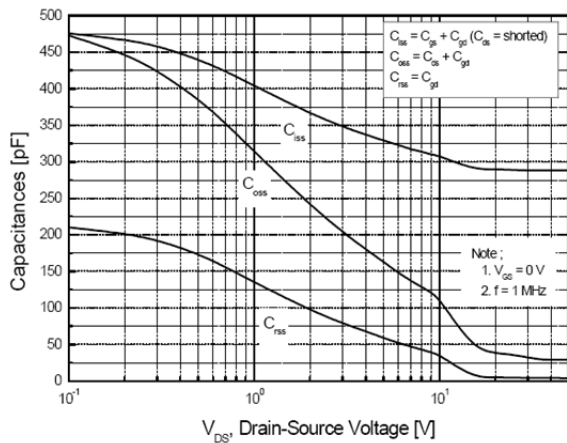


Fig. 5 Capacitance Characteristics

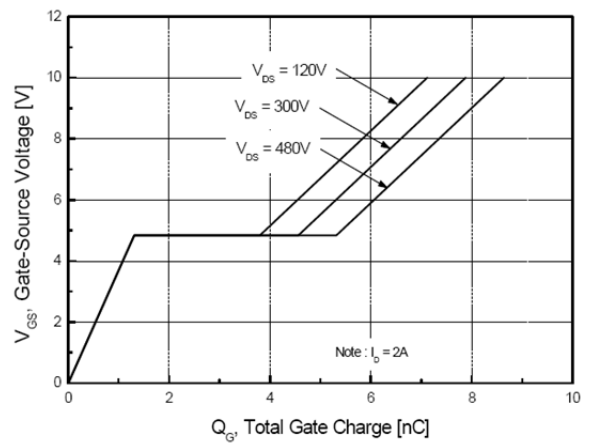


Fig. 6 Gate Charge Characteristics

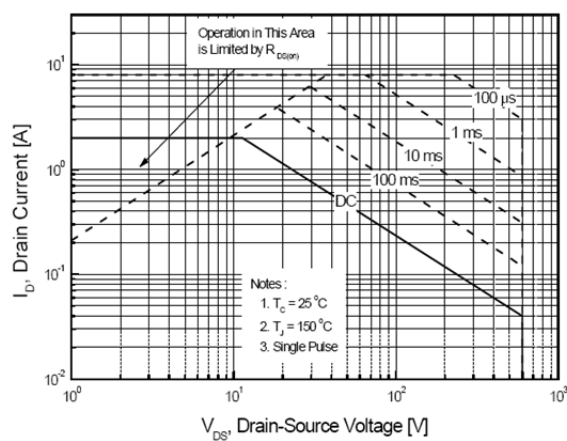


Fig. 7 Maximum Safe Operating Area

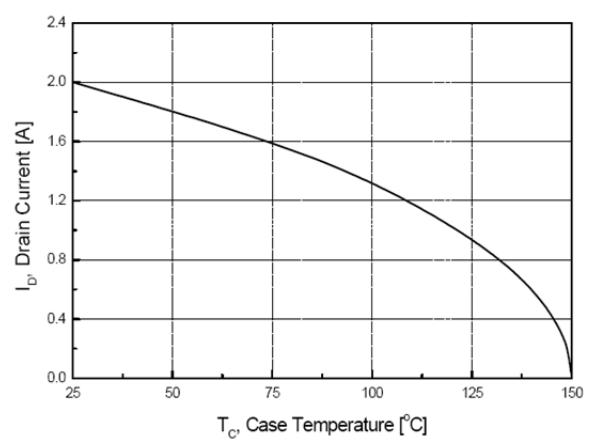


Fig. 8 Maximum Drain Current vs Case Temperature

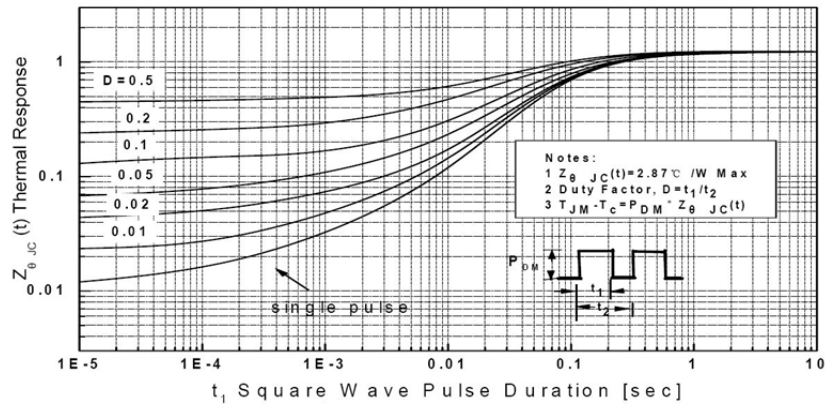


Fig. 9 Transient Thermal Response Curve(TO-251/TO-252)

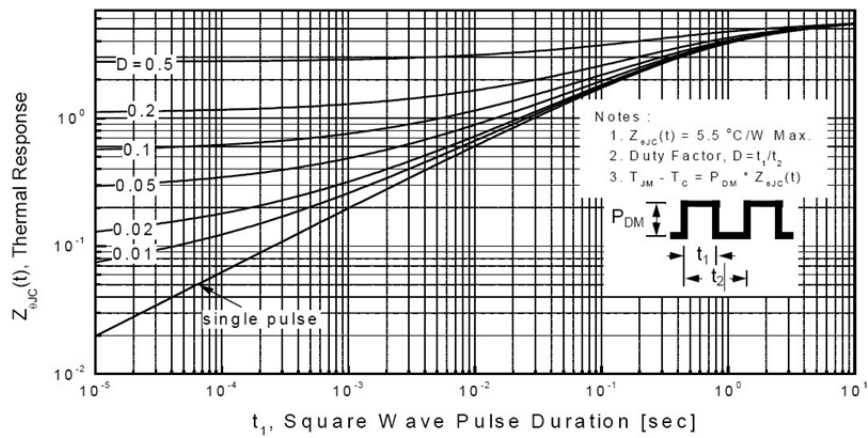


Fig. 10 Transient Thermal Response Curve(ITO-220)

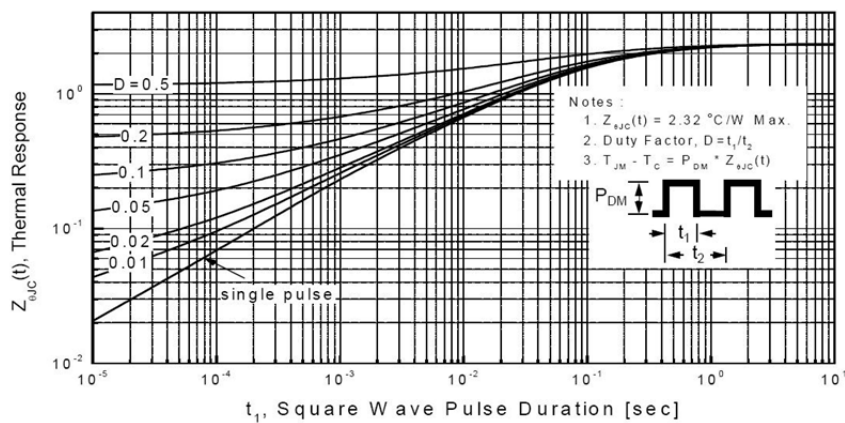
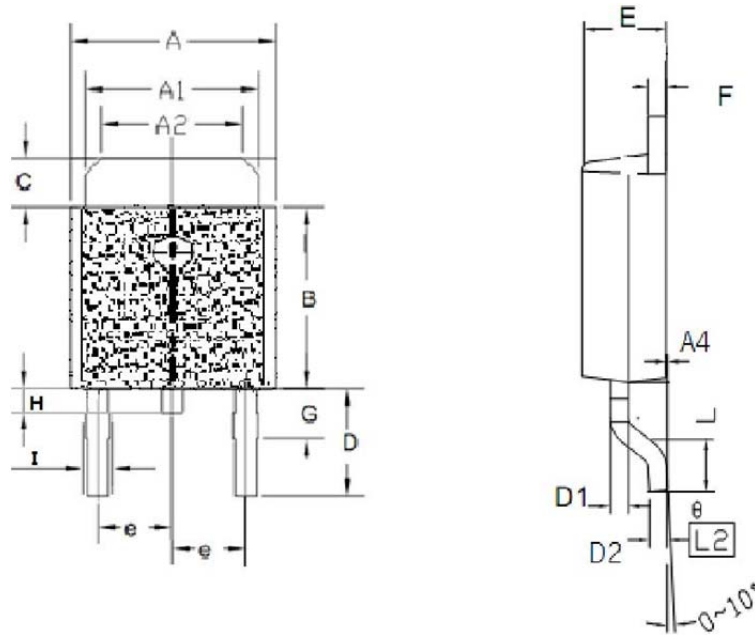


Fig. 11 Transient Thermal Response Curve(TO-220AB)

TO-252



Symbol	Min	Max	Symbol	Min	Max
A	6.40	6.60	D	2.90	3.10
A1	5.20	5.40	D1	0.45	0.55
A2	4.40	4.60	D2	0.45	0.55
A3	4.40	4.60	e	2.30	
A4	0.00	0.15	E	2.20	2.40
A5	4.65	4.95	F	0.49	0.59
B	6.00	6.20	G	1.70	
B1	1.57	1.77	L	1.40	1.60
C	0.90	0.96	$\theta$ (度)	0.00	10.00
I	0.60	0.90	H	0.49	0.52