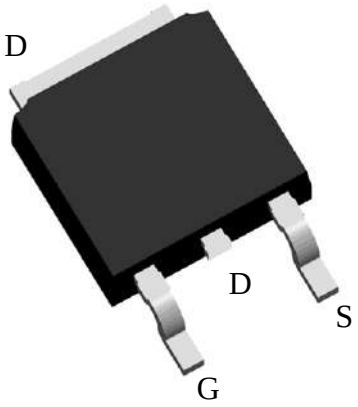
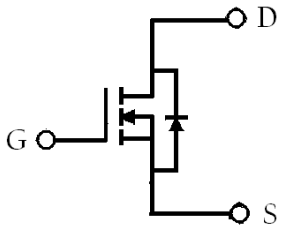
N -Channel Enhancement Mode Power MOSFET

TO-252(DPAK)



Features:

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating and halogen-free package



G：Gate D：Drain S：Source

BV_{DSS}	**100V**
I_D @V_{GS}=10V, T_C=25°C	**30A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=20A	**20.5mΩ (typ)**

Ordering Information

Device	Package	Shipping
KJE020N10R	TO-252 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

Absolute Maximum Ratings (T_C=25°C, unless otherwise noted)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±25	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V		I_D	30	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V			21.2	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V	*2	I_{DSM}	7	
Continuous Drain Current @ T_A=100°C, V_{GS}=10V	*2		4.4	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V	*3		5.7	
Continuous Drain Current @ T_A=100°C, V_{GS}=10V	*3		3.6	
Pulsed Drain Current	*1	I_{DM}	100	
Avalanche Current @L=0.1mH		I_{AS}	32	
Avalanche Energy @ L=1mH, I_D=15A, V_{DD}=25V	*4	E_{AS}	112	mJ
Total Power Dissipation @T_C=25℃		P_D	60	W
Total Power Dissipation @T_C=100℃			30	
Total Power Dissipation @T_A=25℃	*2	P_{DSM}	2.5	
Total Power Dissipation @T_A=100℃	*2		1.0	
Total Power Dissipation @T_A=25℃	*3		1.7	
Total Power Dissipation @T_A=100℃	*3		0.7	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+175	°C

Thermal Data

Parameter		Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max		$R_{th,j-c}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	*2	$R_{th,j-a}$	50	
Thermal Resistance, Junction-to-ambient, max	*3		75	

Note : *1. Pulse width limited by maximum junction temperature
*2. When the device is mounted on 1 in² FR-4 board with 2 oz. copper.
*3. When the device is on the minimum pad size recommended.
*4. 100% tested by conditions of L=0.1mH, I_{AS}=20A, V_{GS}=10V, V_{DD}=25V.
*5. The power dissipation P_D is based on $T_{J(MAX)}$=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
*6. The power dissipation PDSM is based on RθJA and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

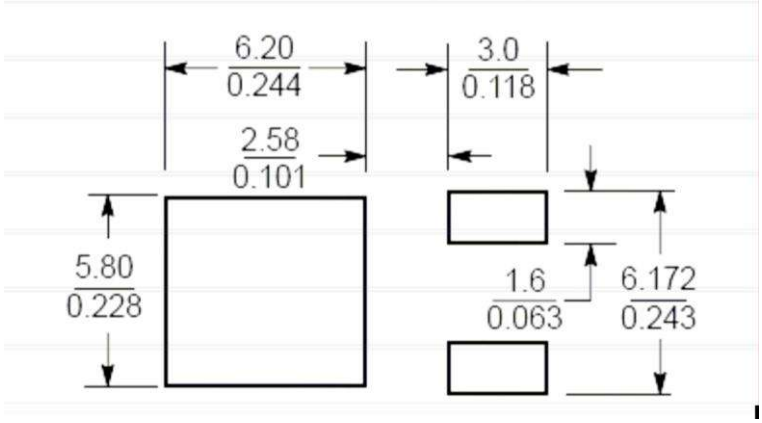
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.1	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2	-	4	V	V_{DS} =V_{GS}, I_D=250μA
G_{FS} *1	-	11.3	-	S	V_{DS} =10V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±25V, V_{DS}=0V

I_{DSS}	-	-	1	μA	V_{DS} =80V, V_{GS} =0V
	-	-	25		V_{DS} =80V, V_{GS} =0V, Tj=125°C
$R_{DS(ON)}$ *1	-	20.5	30	mΩ	V_{GS} =10V, I_D=20A
Dynamic					
Qg *1, 2	-	15.9	-	nC	I_D=20A, V_{DS}=50V, V_{GS}=10V
Qgs *1, 2	-	5.9	-		
Qgd *1, 2	-	4.4	-		
$t_{d(ON)}$ *1, 2	-	14	-	ns	V_{DS}=50V, I_D=20A, V_{GS}=10V, R_G=3Ω
tr *1, 2	-	16	-		
$t_{d(OFF)}$ *1, 2	-	20.8	-		
t_f *1, 2	-	7.2	-		
Ciss	-	975	-	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Coss	-	160	-		
Crss	-	21	-		
Rg	-	1.2	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	30	A	
I_{SM} *3	-	-	100		
V_{SD} *1	-	0.74	1	V	I_S=1A, V_{GS}=0V
trr	-	27.9	-	ns	I_F=20A, dI_F/dt=100A/μs
Qrr	-	31.6	-	nC	

Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

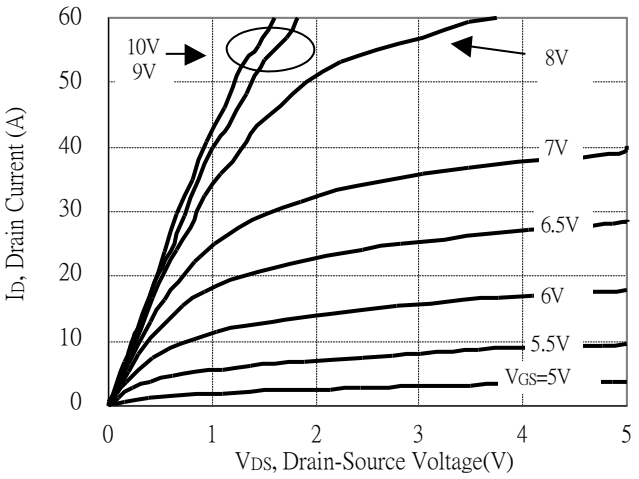
Recommended soldering footprint



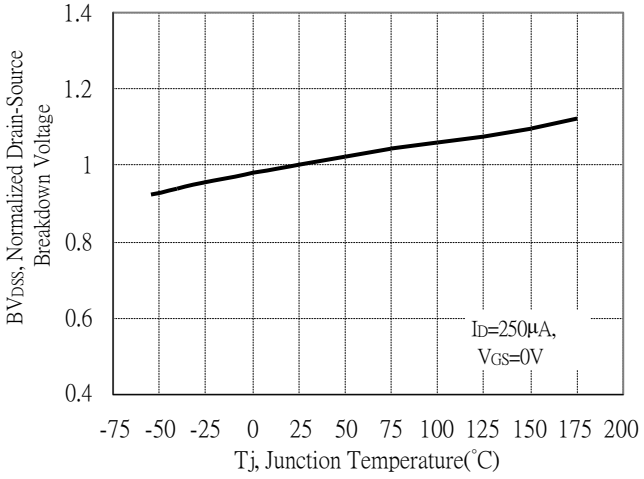
Unit (mm / inch)

Typical Characteristics

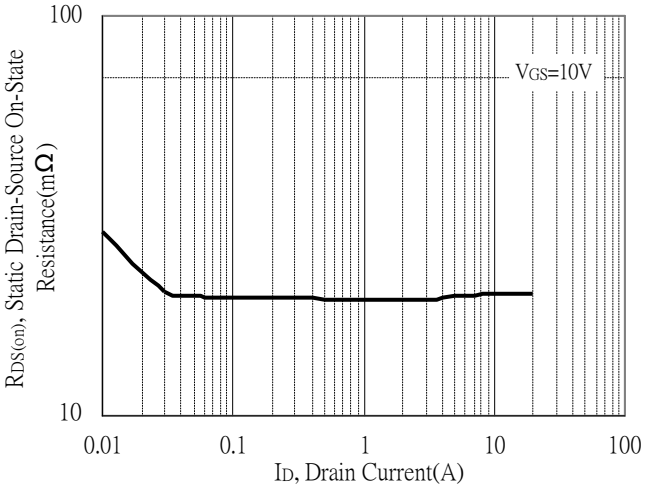
Typical Output Characteristics



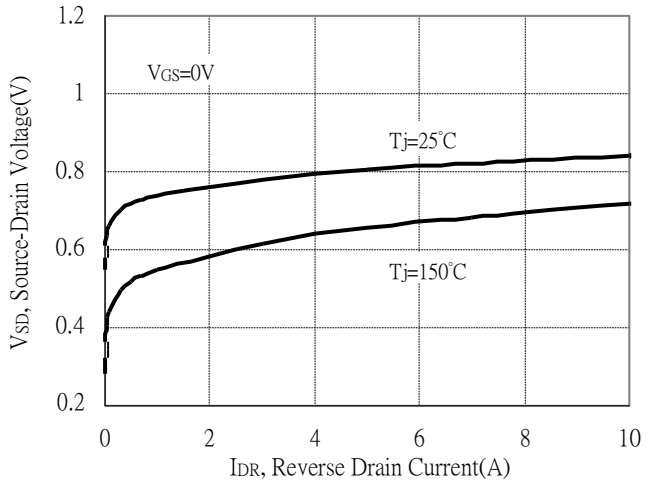
Brekdown Voltage vs Ambient Temperature



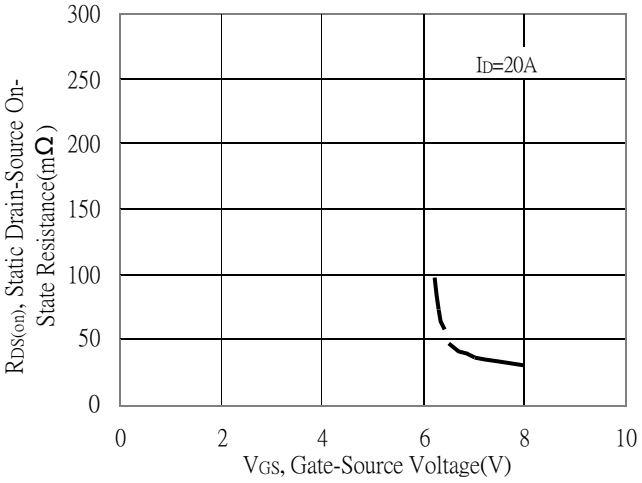
Static Drain-Source On-State resistance vs Drain Current



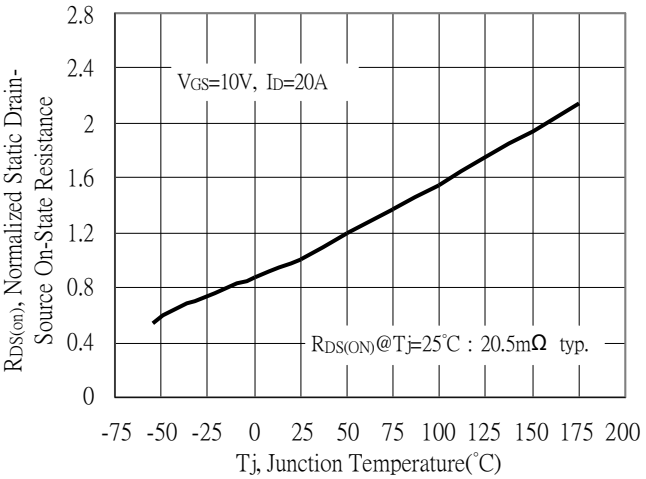
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

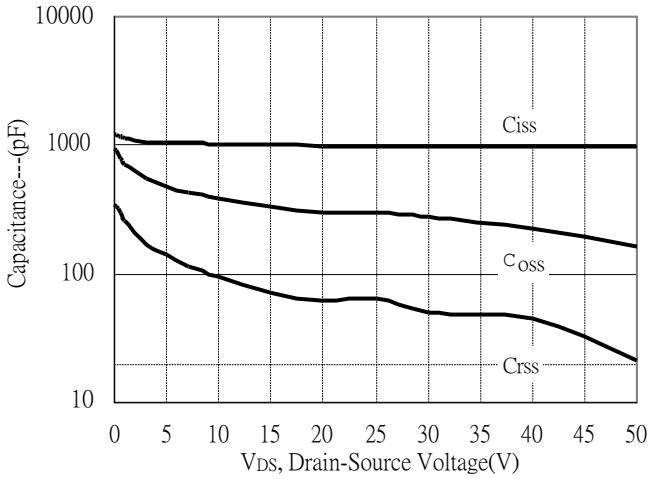


Drain-Source On-State Resistance vs Junction Tempearture

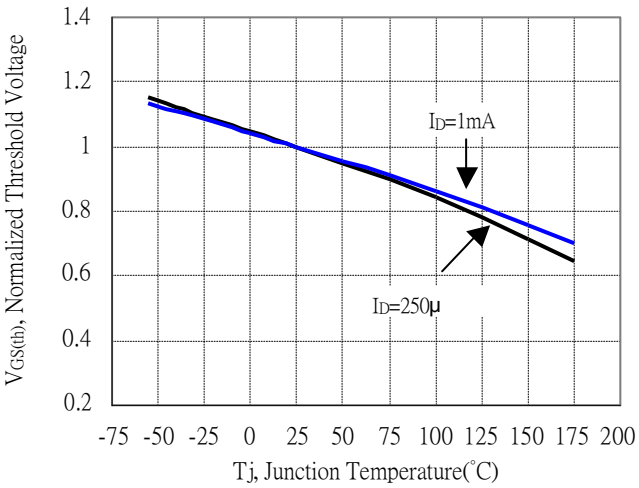


Typical Characteristics(Cont.)

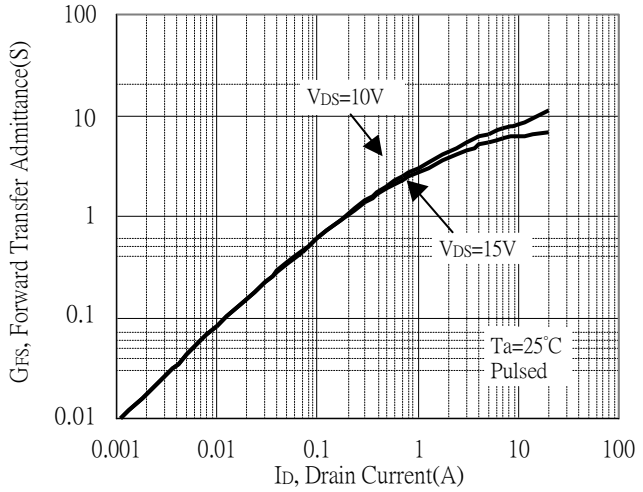
Capacitance vs Drain-to-Source Voltage



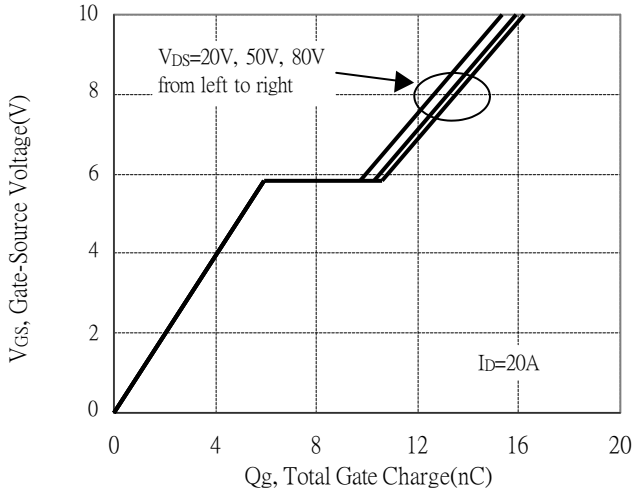
Threshold Voltage vs Junction Tempearture



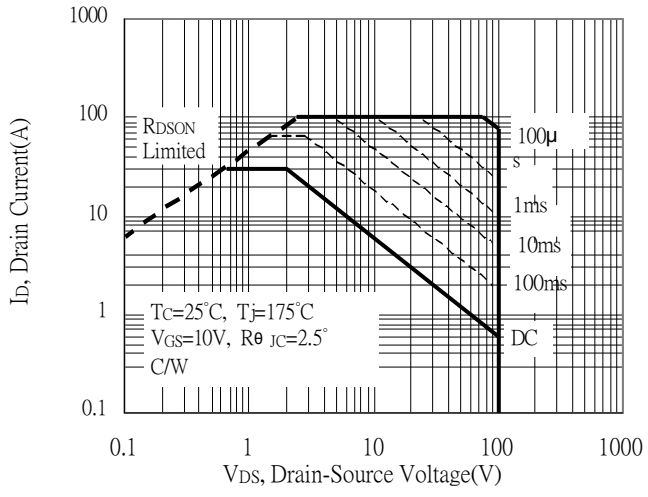
Forward Transfer Admittance vs Drain Current



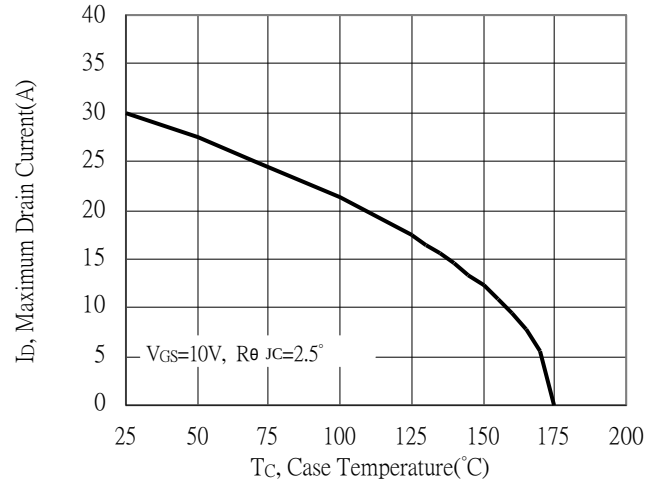
Gate Charge Characteristics



Maximum Safe Operating Area

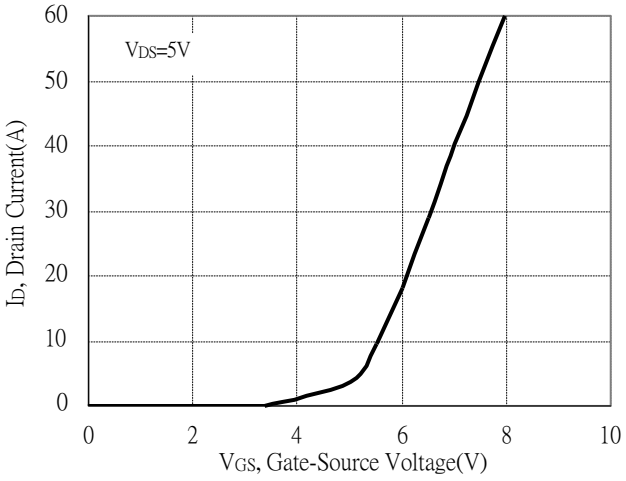


Maximum Drain Current vs Case Temperature

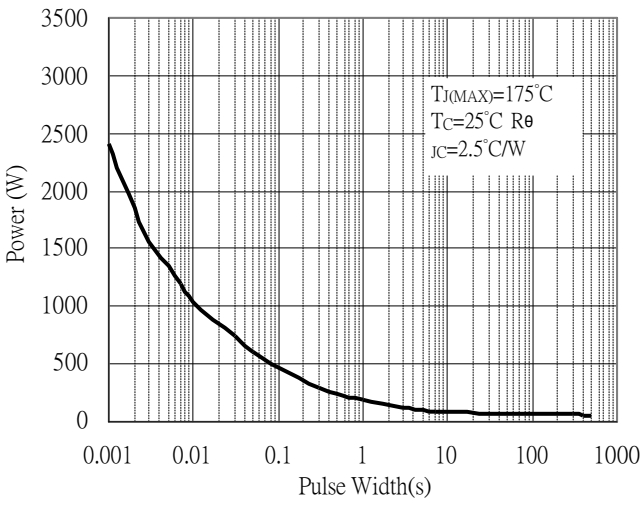


Typical Characteristics(Cont.)

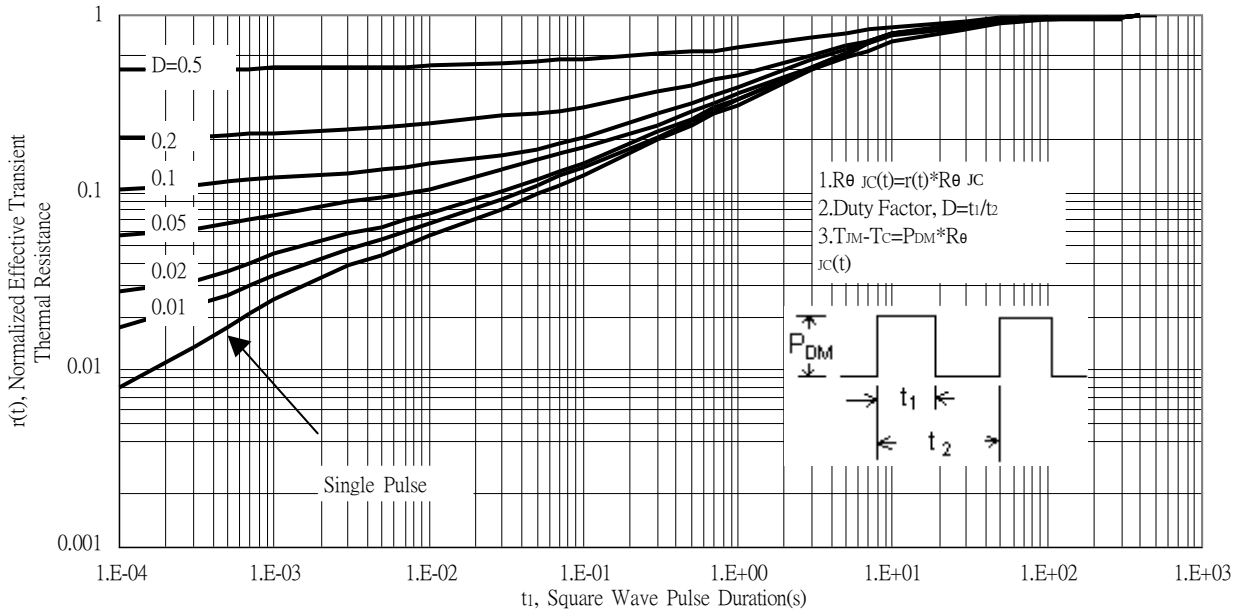
Typical Transfer Characteristics



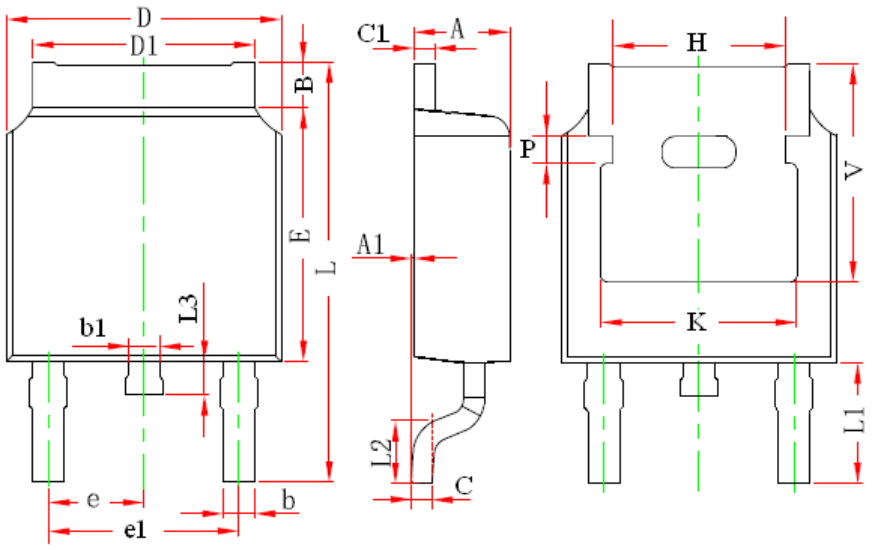
Single Pulse Power Rating, Junction to Case



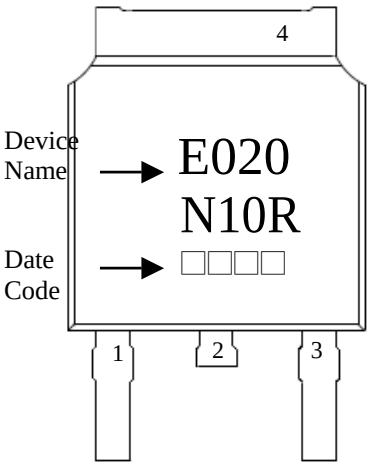
Transient Thermal Response Curves



TO-252 Dimension



Marking:



3-Lead TO-252 Plastic Surface Mount Package
Code: J3

Style: Pin 1.Gate 2.Drain 3.Source
4.Drain

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	e	0.086	0.094	2.186	2.386
A1	0.000	0.005	0.000	0.127	e1	0.172	0.188	4.372	4.772
B	0.039	0.048	0.990	1.210	H	0.163	REF	4.140	REF
b	0.026	0.034	0.660	0.860	K	0.190	REF	4.830	REF
b1	0.026	0.034	0.660	0.860	L	0.386	0.409	9.800	10.400
C	0.018	0.023	0.460	0.580	L1	0.114	REF	2.900	REF
C1	0.018	0.023	0.460	0.580	L2	0.055	0.067	1.400	1.700
D	0.256	0.264	6.500	6.700	L3	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	P	0.026	REF	0.650	REF
E	0.236	0.244	6.000	6.200	V	0.211	REF	5.350	REF