

APPLICATION

- ◆ Buck Converter High Side Switch
- ◆ Other Applications

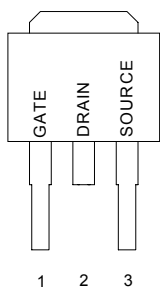
V_{DSS}	$R_{DS(ON)}$ Typ.	I_D
30V	10.8m Ω	50A

FEATURES

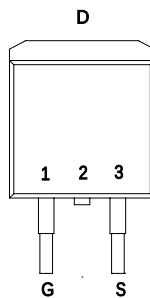
- ◆ Low ON Resistance
- ◆ Low Gate Charge
- ◆ Peak Current vs Pulse Width Curve
- ◆ Inductive Switching Curves
- ◆ Improved UIS Ruggedness

PIN CONFIGURATION

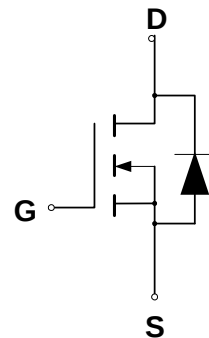
TO-252
Front View



TO-263
Front View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Source Voltage (Note 1)	V_{DSS}	30	V
Drain to Current - Continuous $T_c = 25^\circ\text{C}$, $V_{GS}@10\text{V}$ (Note 2)	I_D	50	A
- Continuous $T_c = 100^\circ\text{C}$, $V_{GS}@10\text{V}$ (Note 2)	I_D	Fig.3	
- Pulsed $T_c = 25^\circ\text{C}$, $V_{GS}@10\text{V}$ (Note 3)	I_{DM}	Fig.6	
Gate-to-Source Voltage - Continue	V_{GS}	± 20	V
Total Power Dissipation	P_D	52	W
Derating Factor above 25		0.5	W/
Peak Diode Recovery dv/dt (Note 4)	dv/dt	3.0	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	
Single Pulse Avalanche Energy $L=1.1\text{mH}, I_D=30\text{Amps}$	E_{AS}	500	mJ
Maximum Lead Temperature for Soldering Purposes	T_L	300	
Maximum Package Body for 10 seconds	T_{PKG}	260	
Pulsed Avalanche Rating	I_{AS}	Fig.8	

THERMAL RESISTANCE

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
$R_{\theta JC}$	Junction-to-case			2.4	/W	Water cooled heatsink, P_D adjusted for a peak junction temperature of +150
$R_{\theta JA}$	Junction-to-ambient (PCB Mount)			50	/W	Minimum pad area, 2-oz copper, FR-4 circuit board, double sided
$R_{\theta JA}$	Junction-to-ambient			62	/W	1 cubic foot chamber, free air

ORDERING INFORMATION

Part Number	Package
CMT60N03N252	TO-252
CMT60N03N263	TO-263

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25^\circ\text{C}$.

		CMT60N03				
Characteristic	Symbol	Min	Typ	Max	Units	
OFF Characteristics						
Drain-to-Source Breakdown Voltage ($V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$)	V_{DSS}	30			V	
Breakdown Voltage Temperature Coefficient, Fig.11 (Reference to $25\text{ }^{\circ}\text{C}$, $I_D = 250\text{ }\mu\text{A}$)	$\Delta V_{DSS}/\Delta T_J$		27		mV/	
Drain-to-Source Leakage Current ($V_{DS} = 24\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 25\text{ }^{\circ}\text{C}$) ($V_{DS} = 24\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$)	I_{DSS}			1 10	μA	
Gate-to-Source Forward Leakage ($V_{GS} = 20\text{ V}$)	I_{GSS}			100	nA	
Gate-to-Source Reverse Leakage ($V_{GS} = -20\text{ V}$)	I_{GSS}			-100	nA	
ON Characteristics						
Gate Threshold Voltage, Fig.12 ($V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$)	$V_{GS(th)}$	1.0		3.0	V	
Static Drain-to-Source On-Resistance, Fig.9,10 (Note 5) ($V_{GS} = 10\text{ V}$, $I_D = 15\text{A}$) ($V_{GS} = 4.5\text{ V}$, $I_D = 12\text{A}$)	$R_{DS(on)}$		10.8 15.4	12.5	m Ω	
Forward Transconductance ($V_{DS} = 15\text{ V}$, $I_D = 12\text{A}$) (Note 5)	g_{FS}		28		S	
Dynamic Characteristics						
Input Capacitance	$(V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$) Fig.14	C_{iss}		1520	pF	
Output Capacitance		C_{oss}		314	pF	
Reverse Transfer Capacitance		C_{rss}		152	pF	
Total Gate Charge ($V_{GS} = 10\text{ V}$)	$(V_{DS} = 15\text{ V}$, $I_D = 12\text{ A}$) (Note 6) Fig.15	Q_g		27.9	35	nC
Total Gate Charge ($V_{GS} = 4.5\text{ V}$)		Q_g		14	19	nC
Gate-to-Source Charge		Q_{gs}		4.9		nC
Gate-to-Drain Charge		Q_{gd}		4.3		nC
Resistive Switching Characteristics						
Turn-On Delay Time	$(V_{DD} = 15\text{ V}$, $I_D = 12\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 1.0\Omega$) (Note 6)	$t_{d(on)}$		10		ns
Rise Time		t_r		3.4		ns
Turn-Off Delay Time		$t_{d(off)}$		36		ns
Fall Time		t_f		6.0		ns
Turn-On Delay Time	$(V_{DD} = 15\text{ V}$, $I_D = 12\text{ A}$, $V_{GS} = 4.5\text{V}$, $R_G = 1.0\Omega$) (Note 6)	$t_{d(on)}$		16		ns
Rise Time		t_r		7.2		ns
Turn-Off Delay Time		$t_{d(off)}$		34		ns
Fall Time		t_f		14		ns
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode Fig.16)	Integral pn-diode in MOSFET	I_S			50	A
Pulse Source Current (Body Diode)		I_{SM}			Fig.6	A
Forward On-Voltage	$(I_S = 12\text{ A}$, $V_{GS} = 0\text{ V})$	V_{SD}			1.0	V
Forward Turn-On Time	$(I_F = 12\text{ A}$, $V_{GS} = 0\text{ V}$,	t_{rr}		25	38	ns
Reverse Recovery Charge	$d/d_t = 100\text{A}/\mu\text{s})$	Q_{rr}		31	46	nC



CMT60N03

N-CHANNEL Logic Level Power MOSFET

Note 1: $T_J = +25$ to 150

Note 2: Current is calculated based upon maximum allowable junction temperature.
Package current limitation is 30A.

Note 3: Repetitive rating; pulse width limited by maximum junction temperature.

Note 4: $I_{SD} = 12.0A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq BV_{DSS}$, $T_J = +150$

Note 5: Pulse width $\leq 250\mu s$; duty cycle $\leq 2\%$

Note 6: Essentially independent of operating temperature.

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

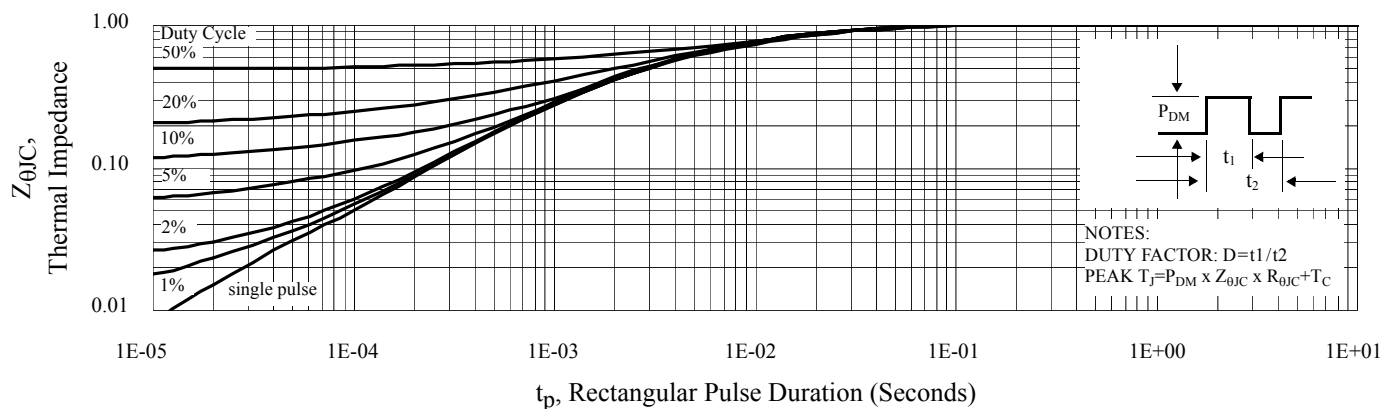


Figure 2. Maximum Power Dissipation vs Case Temperature

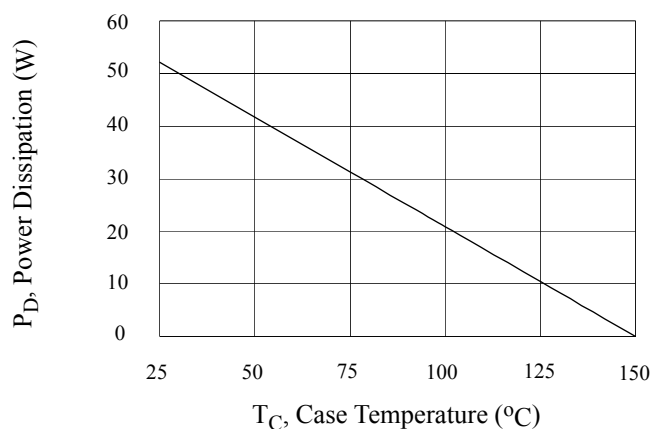


Figure 3. Maximum Continuous Drain Current vs Case Temperature

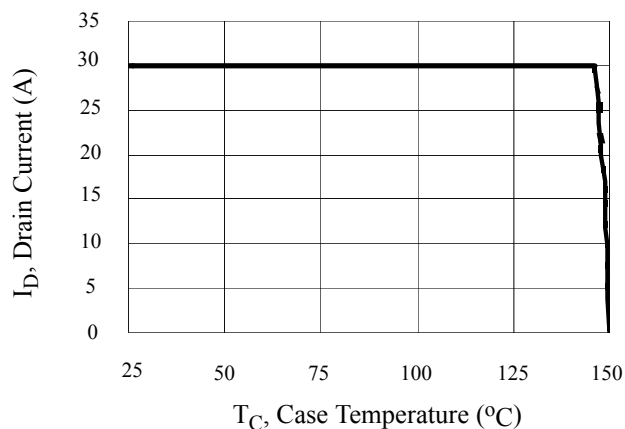


Figure 4. Typical Output Characteristics

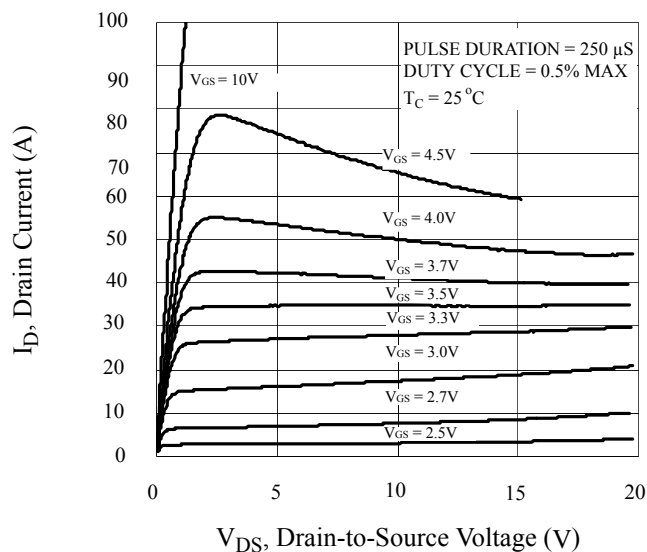


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

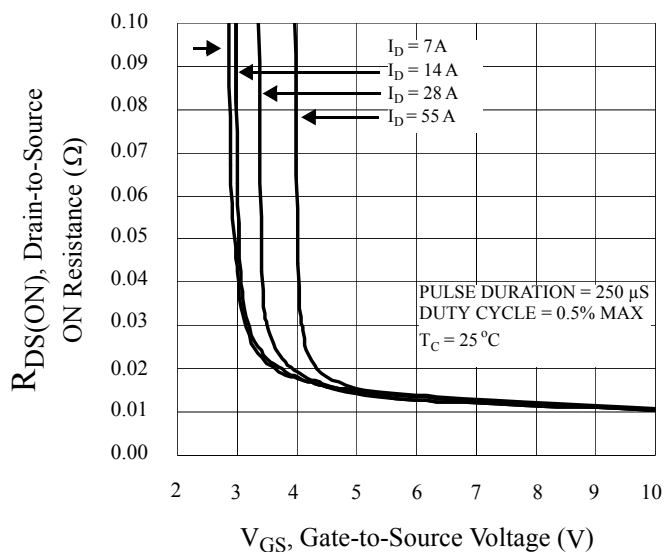


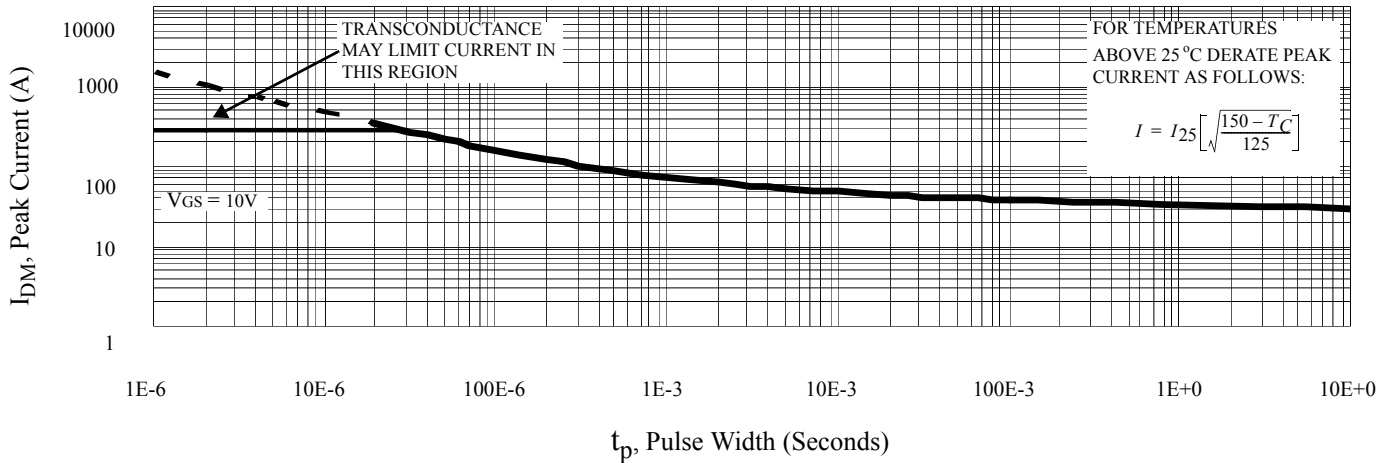
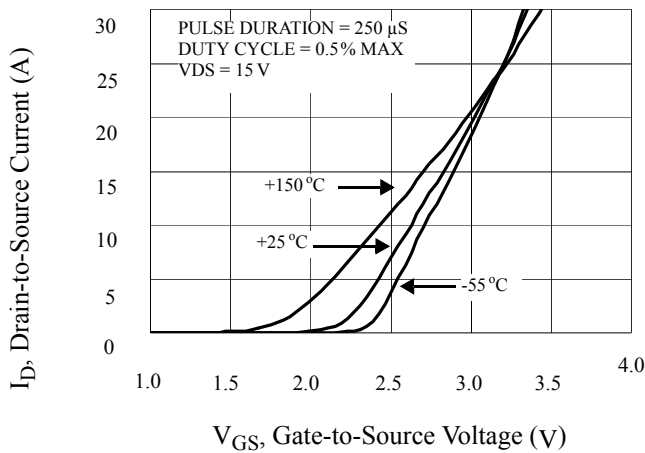
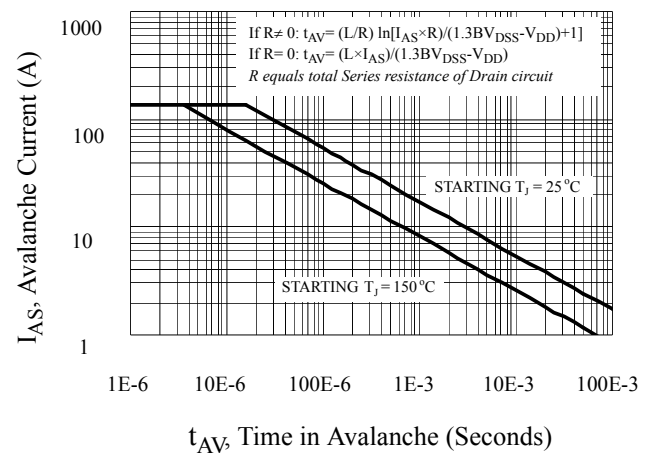
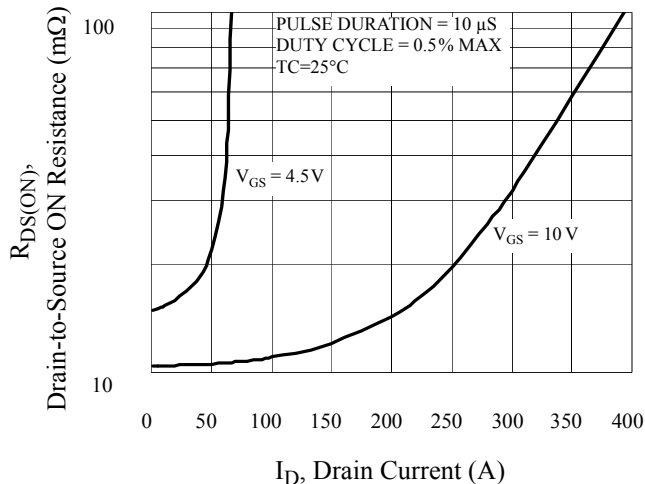
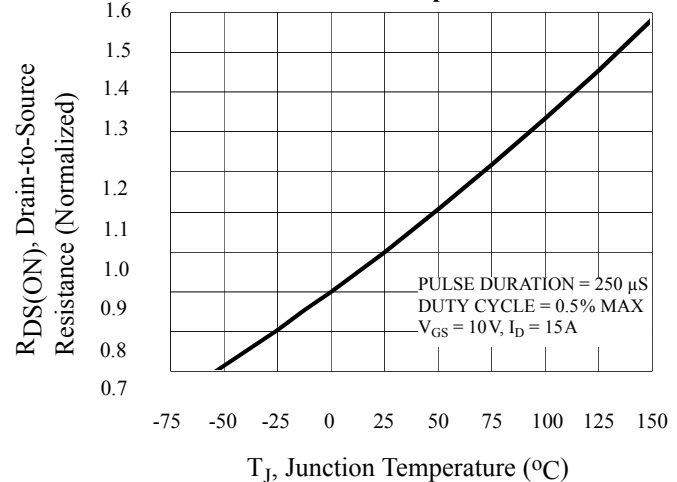
Figure 6. Maximum Peak Current Capability

Figure 7. Typical Transfer Characteristics

Figure 8. Unclamped Inductive Switching Capability

Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature


Figure 11. Typical Breakdown Voltage vs Junction Temperature

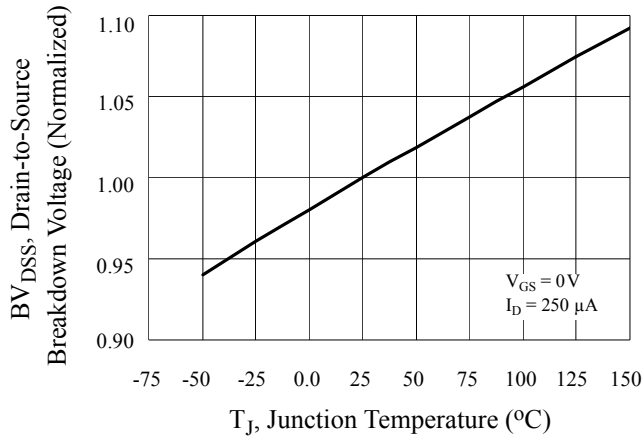


Figure 12. Typical Threshold Voltage vs Junction Temperature

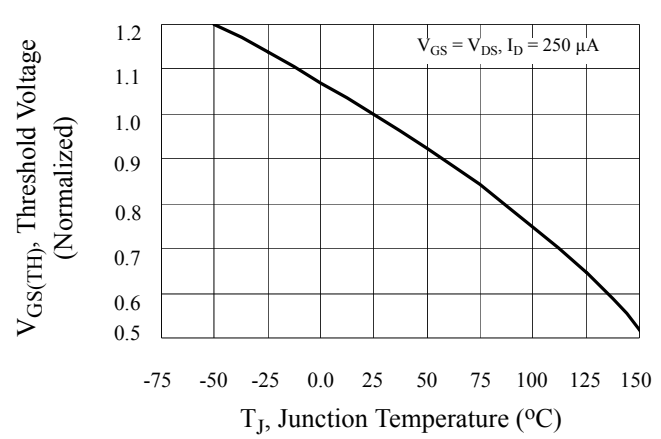


Figure 13. Maximum Forward Bias Safe Operating Area

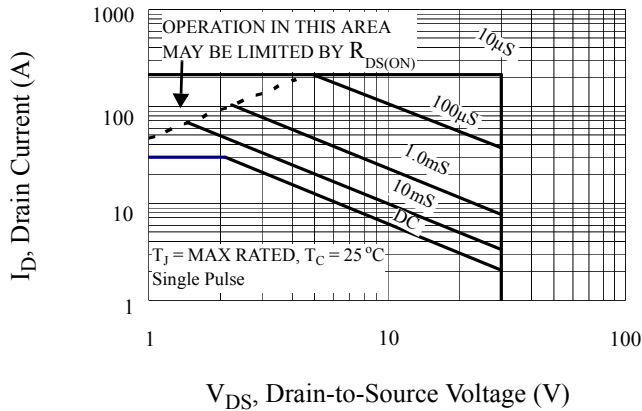


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

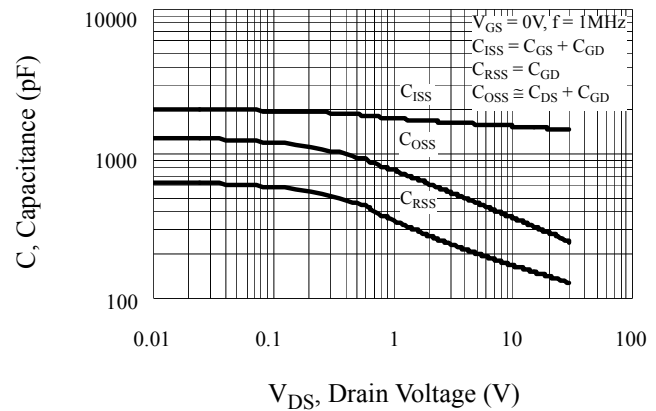


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

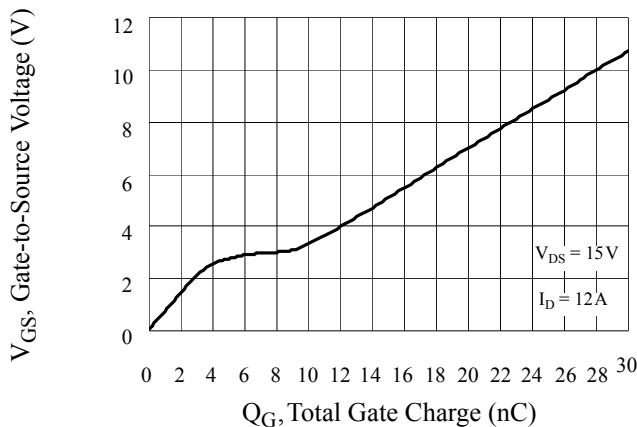
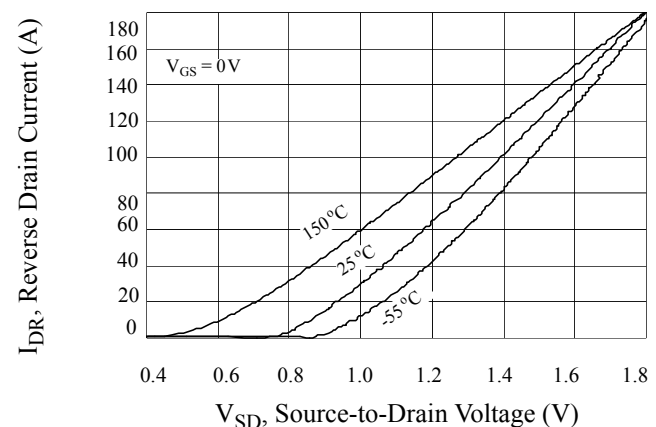
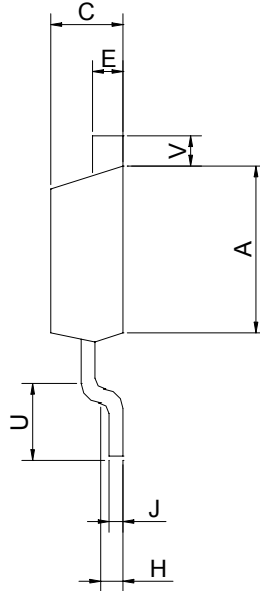
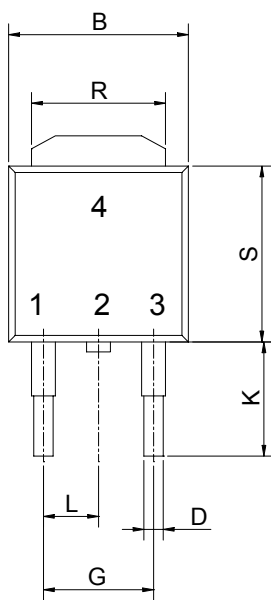


Figure 16. Typical Body Diode Transfer Characteristics



PACKAGE DIMENSION

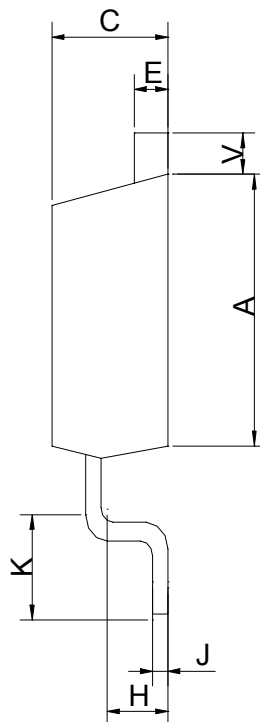
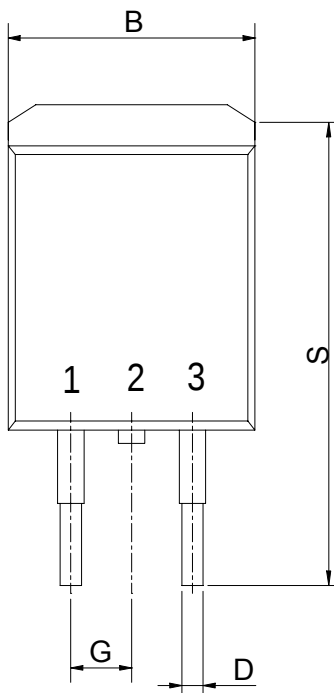
TO-252



PIN 1: GATE
PIN 2: DRAIN
PIN 3: SOURCE

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	5.97	---	6.35	0.235	---	0.250
B	6.35	---	6.73	0.250	---	0.265
C	2.19	---	2.38	0.086	---	0.094
D	0.69	---	0.88	0.027	---	0.035
E	0.84	---	1.01	0.033	---	0.047
G	4.58BSC			0.180BSC		
H	0.87	---	1.01	0.034	---	0.040
J	0.46	---	0.58	0.018	---	0.023
K	2.60	---	2.89	0.102	---	0.114
L	2.29BSC			0.090BSC		
R	4.45	---	5.46	0.175	---	0.215
S	0.51	---	1.27	0.020	---	0.050
U	0.51	---	---	0.020	---	---
V	0.77	---	1.27	0.030	---	0.050

TO-263



PIN 1: GATE
PIN 2: DRAIN
PIN 3: SOURCE

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	8.64	---	9.65	0.340	---	0.380
B	9.65	---	10.29	0.380	---	0.405
C	4.06	---	4.83	0.160	---	0.190
D	0.51	---	0.89	0.020	---	0.035
E	1.14	---	1.40	0.045	---	0.055
G	2.54BSC			0.100BSC		
H	2.03	---	2.79	0.080	---	0.110
J	0.46	---	0.64	0.018	---	0.025
K	2.29	---	2.79	0.090	---	0.110
S	14.60	---	15.88	0.575	---	0.625
V	1.14	---	1.40	0.045	---	0.055

IMPORTANT NOTICE

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