

APPLICATION

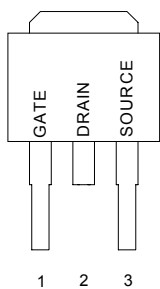
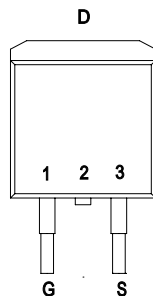
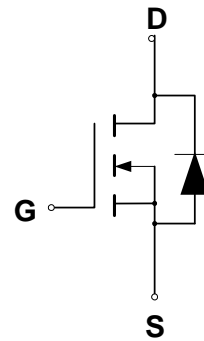
- ◆ Buck Converter High Side Switch
- ◆ Other Applications

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
	I_D	Fig.3	
	I_{DM}	Fig.6	
Gate-to-Source Voltage - Continue	V_{GS}	± 20	V
Total Power Dissipation	P_D	52	W
		0.5	W/
Derating Factor above 25			
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 °C .

Characteristic	Symbol	CMT60N03			Units
		Min	Typ	Max	
OFF Characteristics					
Drain-to-Source Breakdown Voltage (V _{GS} = 0 V, I _D = 250 μA)	V _{DSS}	30			V
Breakdown Voltage Temperature Coefficient, Fig.11 (Reference to 25 °C, I _D = 250 μA)	V _{DSS} /ΔT _J		27		mV/°C
Drain-to-Source Leakage Current (V _{DS} = 24 V, V _{GS} = 0 V, T _J = 25 °C) (V _{DS} = 24 V, V _{GS} = 0 V, T _J = 125 °C)	I _{DSS}			1 10	μA
Gate-to-Source Forward Leakage (V _{GS} = 20 V)	I _{GSS}			100	nA
Gate-to-Source Reverse Leakage (V _{GS} = -20 V)	I _{GSS}			-100	nA
ON Characteristics					
Gate Threshold Voltage, Fig.12 (V _{DS} = V _{GS} , I _D = 250 μA)	V _{GS(th)}	1.0		3.0	V
Static Drain-to-Source On-Resistance, Fig.9,10 (Note 5) (V _{GS} = 10 V, I _D = 15A) (V _{GS} = 4.5 V, I _D = 12A)	R _{DS(on)}		10.8 15.4	12.5	mΩ
Forward Transconductance (V _{DS} = 15 V, I _D = 12A) (Note 5)	g _{FS}		28		S
Dynamic Characteristics					
Input Capacitance	(V _{DS} = 15 V, V _{GS} = 0 V, f = 1.0 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 V)	(V _{DS} = 15 V, I _D = 12 A) (Note 6) Fig.15	Q _g	27.9	35	nC
Total Gate Charge (V _{GS} = 4.5 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 V, I _D = 12 A, V _{GS} = 10 V, R _G = 1.0Ω) (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 V, I _D = 12 A, V _{GS} = 4.5V, R _G = 1.0Ω) (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 A, V _{GS} = 0 V)	V _{SD}		1.0	V
Forward Turn-On Time	(I _F = 12 A, V _{GS} = 0 V,	t _{rr}	25	38	ns
Reverse Recovery Charge	d _r /d _t = 100A/μs)	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.

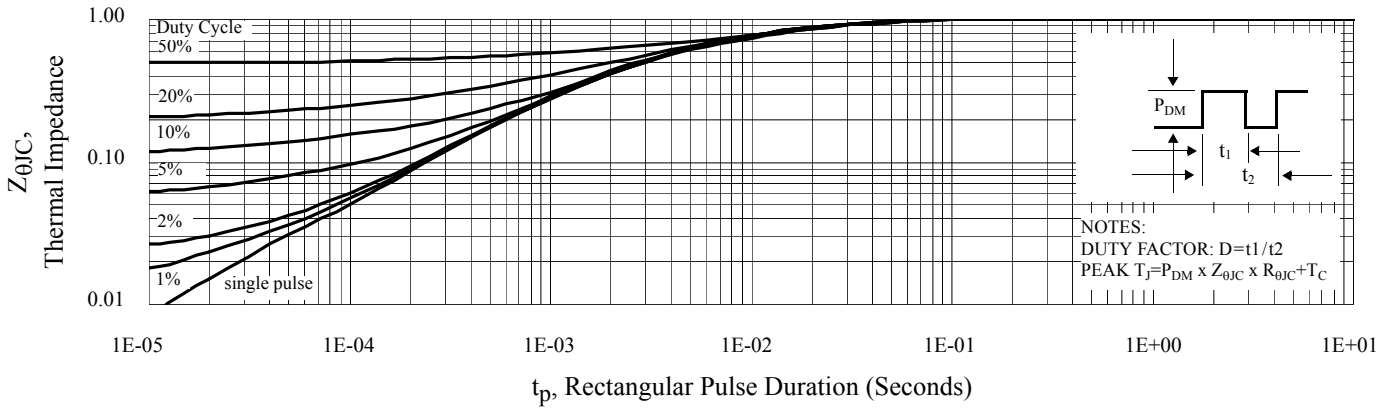
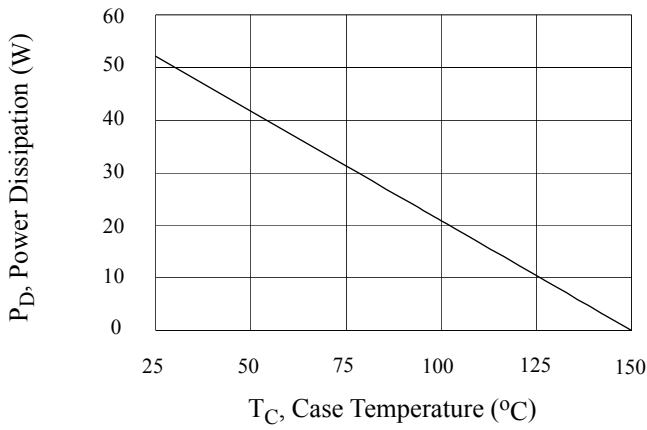
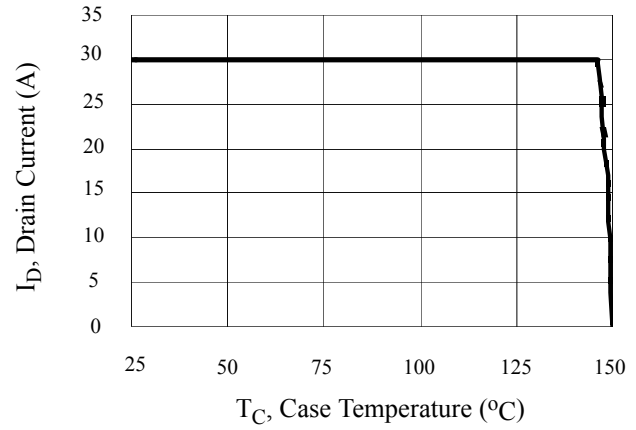
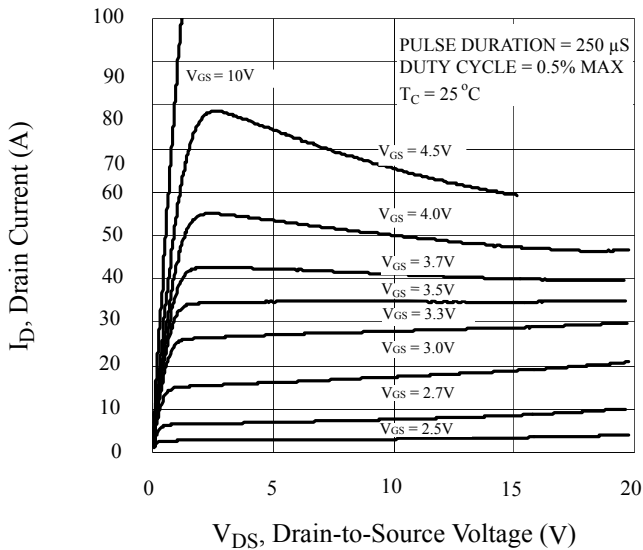
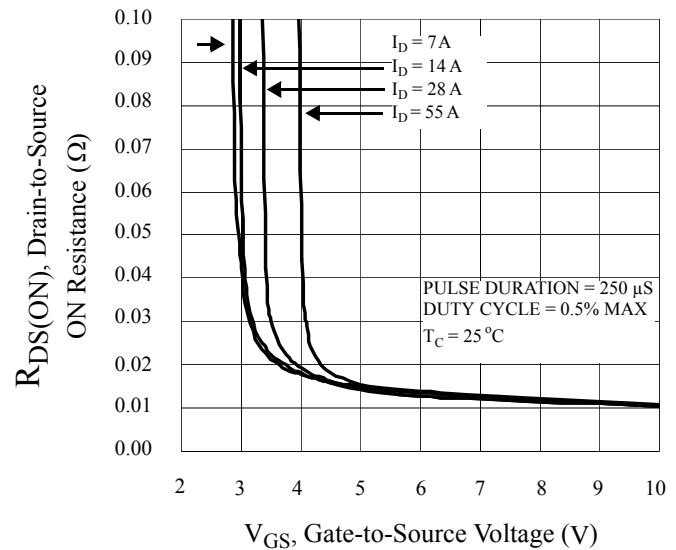
Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

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

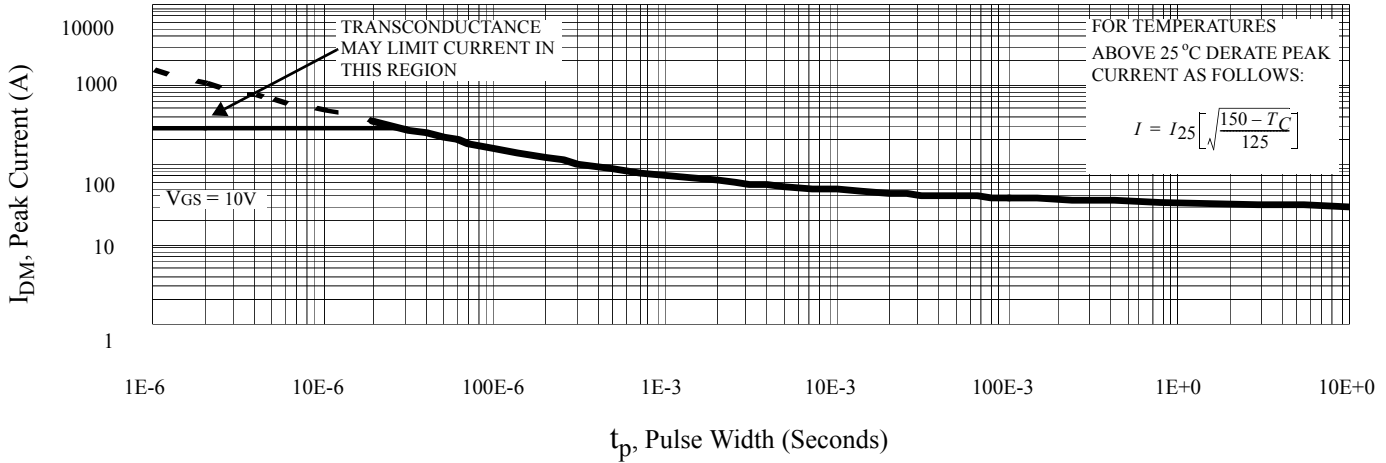


Figure 7. Typical Transfer Characteristics

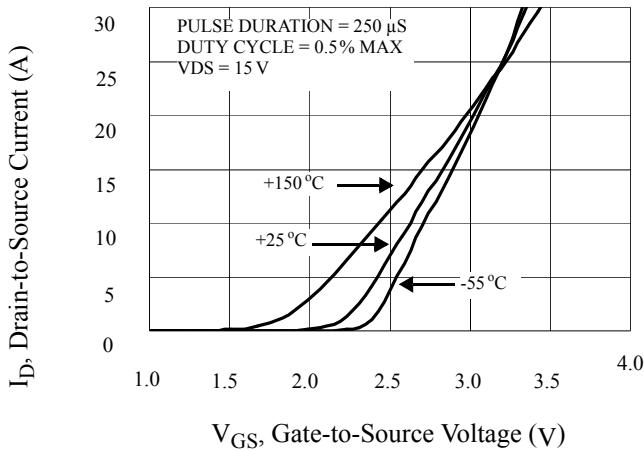


Figure 8. Unclamped Inductive Switching Capability

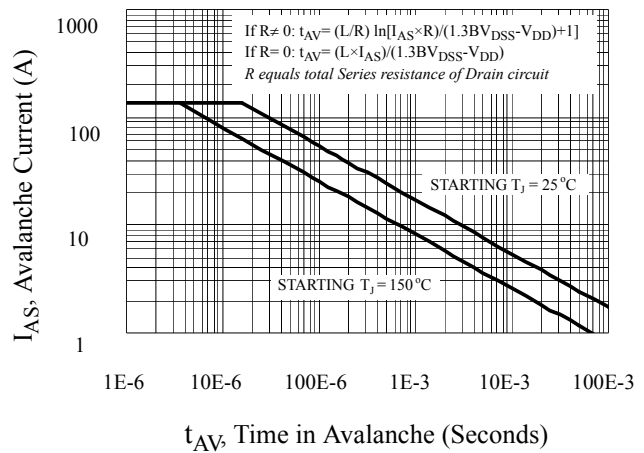


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

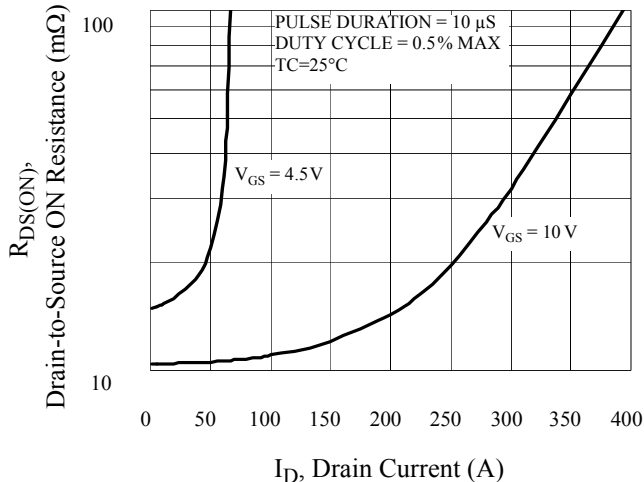


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

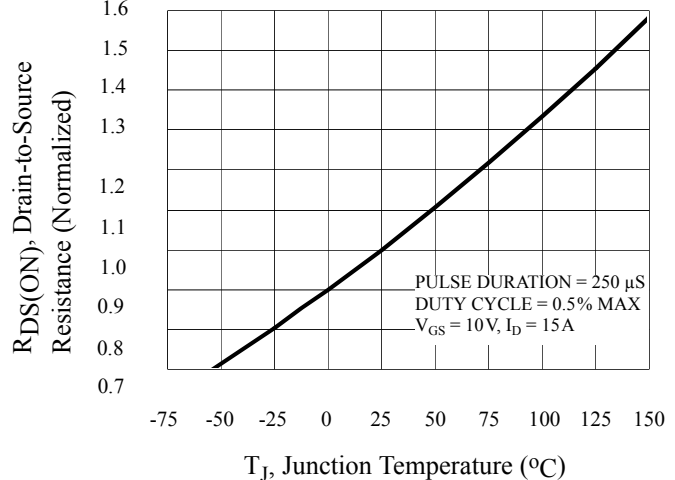


Figure 11. Typical Breakdown Voltage vs Junction Temperature

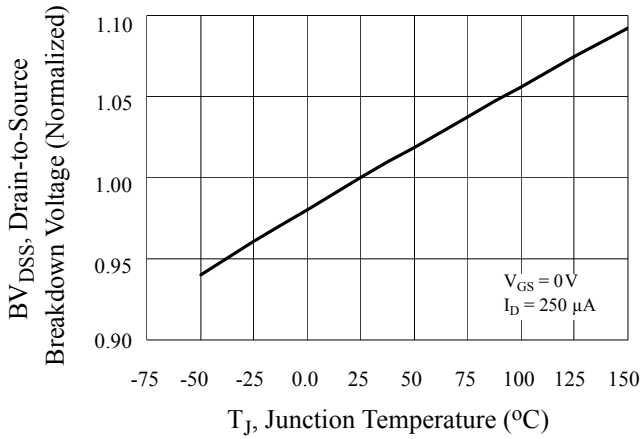


Figure 12. Typical Threshold Voltage vs Junction Temperature

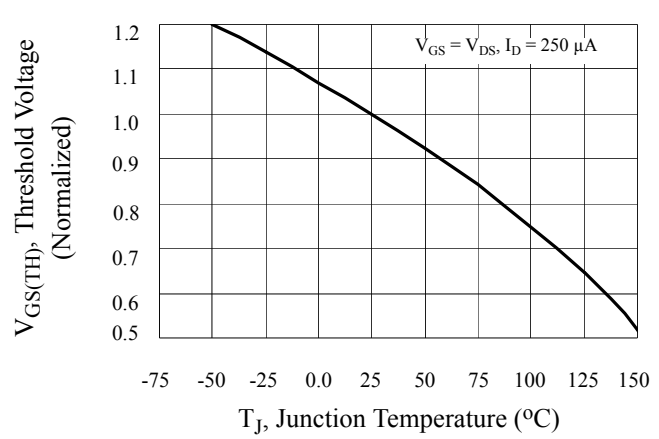


Figure 13. Maximum Forward Bias Safe Operating Area

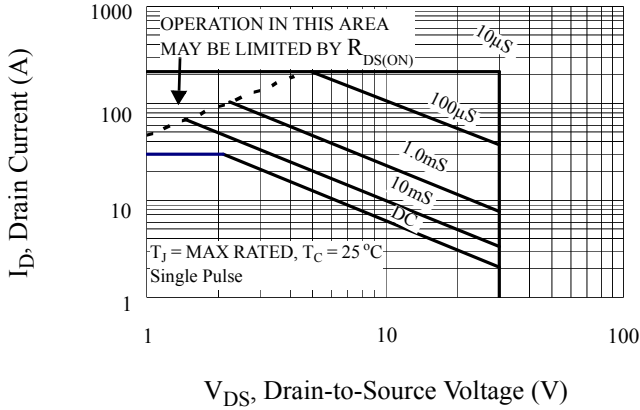


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

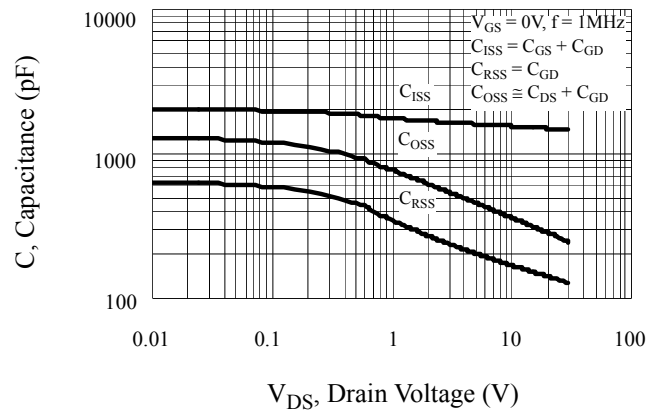


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

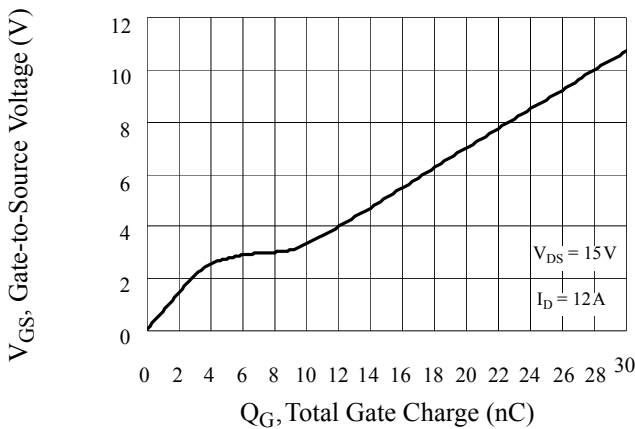
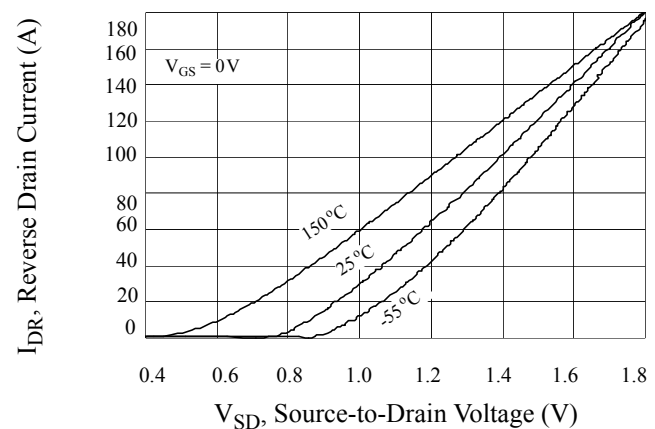
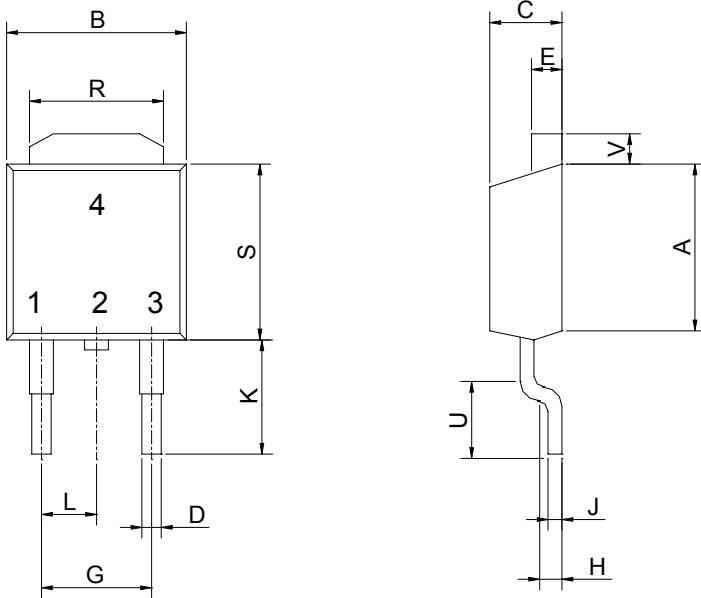


Figure 16. Typical Body Diode Transfer Characteristics



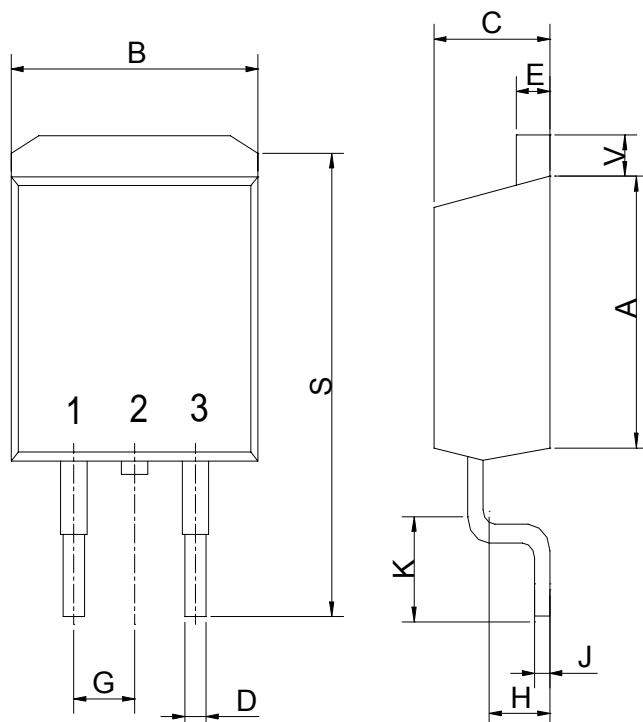
PACKAGE DIMENSION

TO-252


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

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	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	0.89	---	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 INCHS		
	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

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