

APPLICATION

- ◆ Buck Converter High Side Switch
- ◆ Other Applications

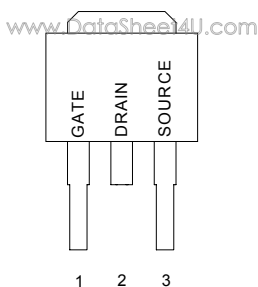
V_{DSS}	$R_{DS(ON)}$ Typ.	I_D
30V	10.8m Ω	50A

FEATURES

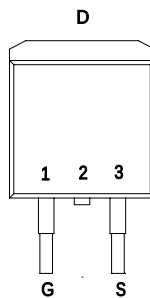
- ◆ Low ON Resistance
- ◆ Low Gate Charge
- ◆ Peak Current vs Pulse Width Curve
- ◆ Inductive Switching Curves
- ◆ Improved UIS Ruggedness

PIN CONFIGURATION

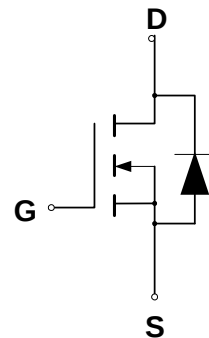
TO-252
Front View



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 V, I _D = 250 μA)	V _{DSS}	30			V	
Breakdown Voltage Temperature Coefficient, Fig.11 (Reference to 25 °C, I _D = 250 μA)	Δ V _{DSS} /Δ T _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 _i /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.

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

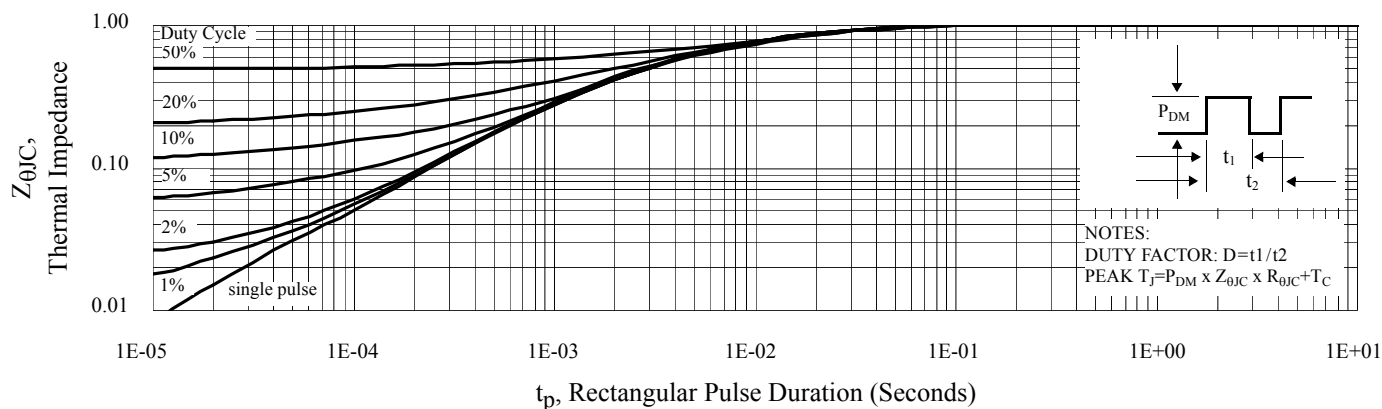


Figure 2. Maximum Power Dissipation vs Case Temperature

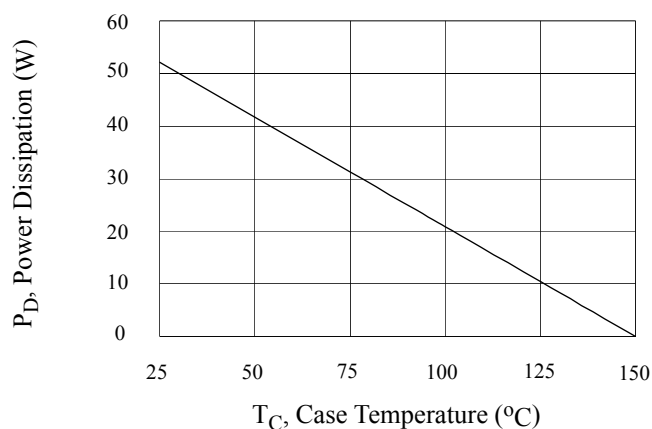


Figure 3. Maximum Continuous Drain Current vs Case Temperature

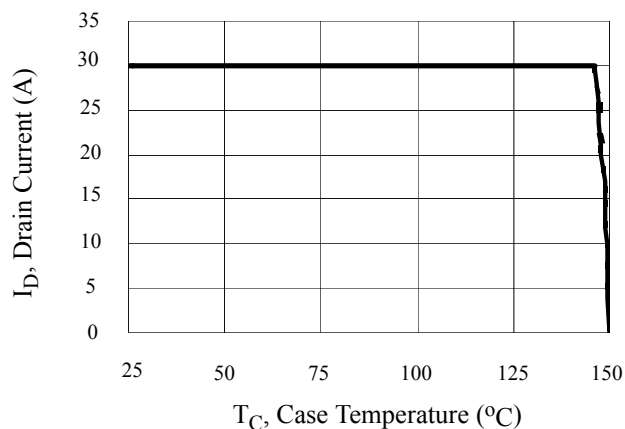


Figure 4. Typical Output Characteristics

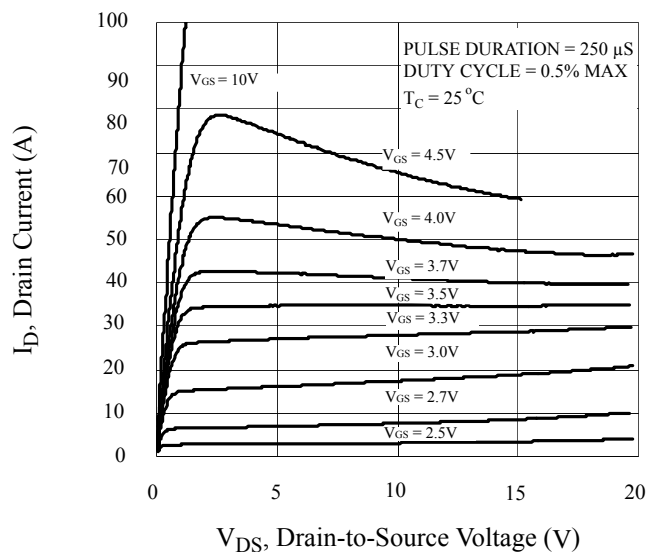


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

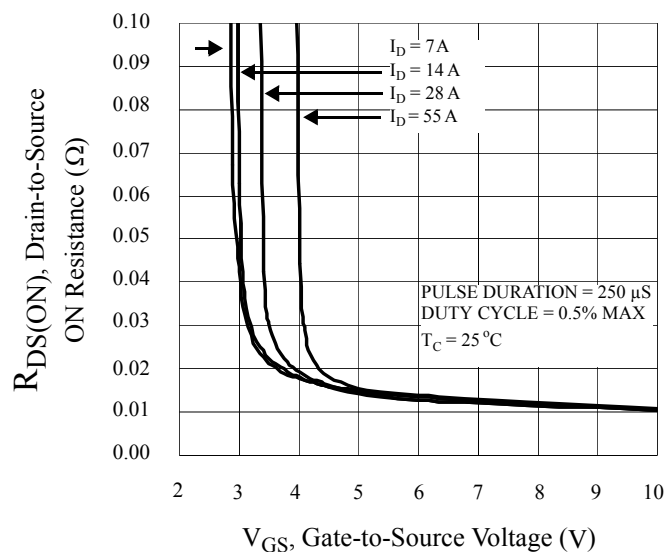
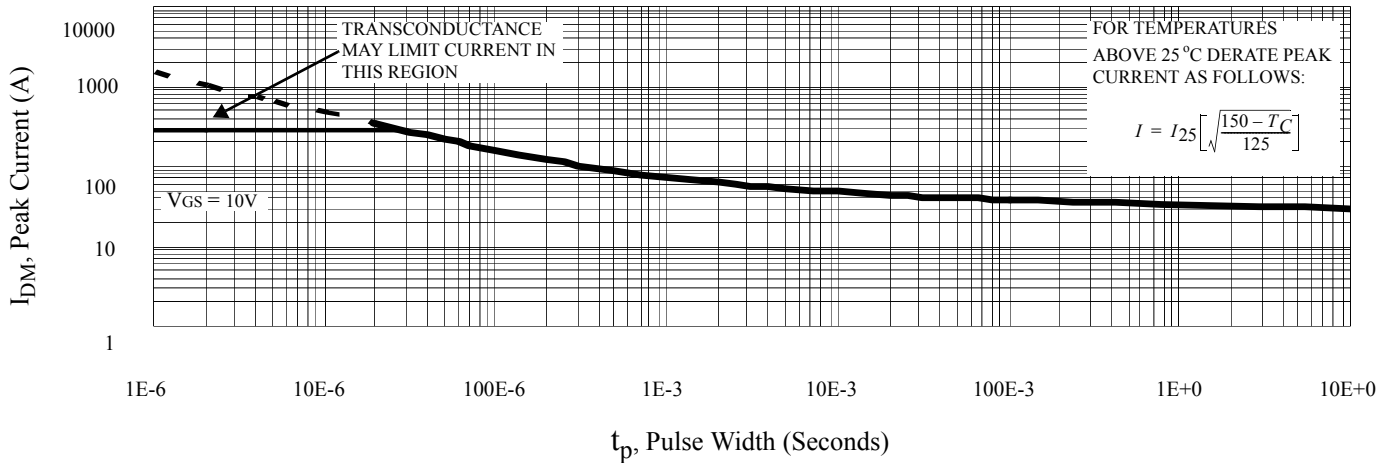


Figure 6. Maximum Peak Current Capability



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Figure 7. Typical Transfer Characteristics

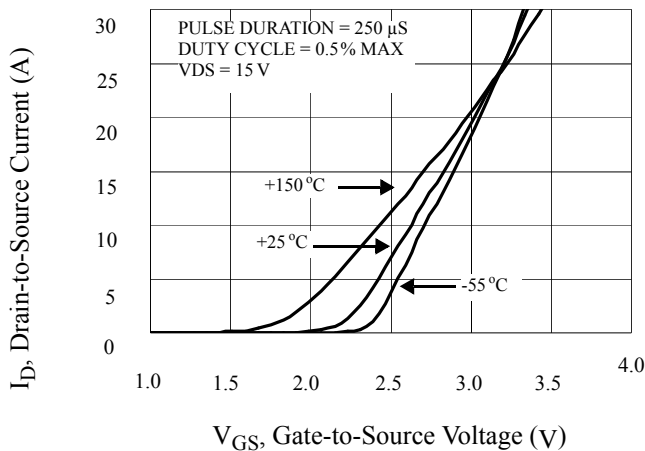


Figure 8. Unclamped Inductive Switching Capability

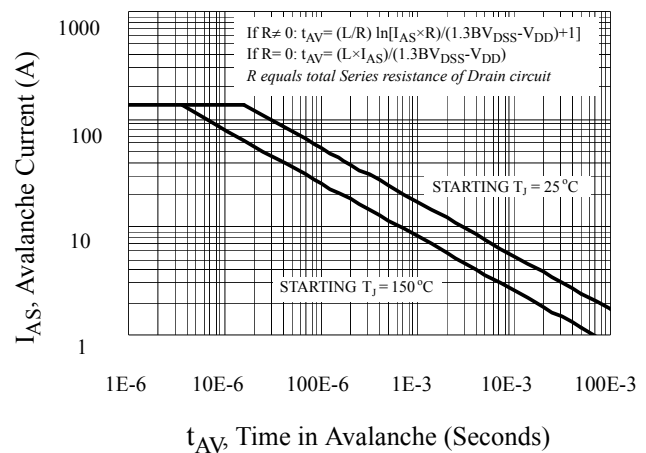


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

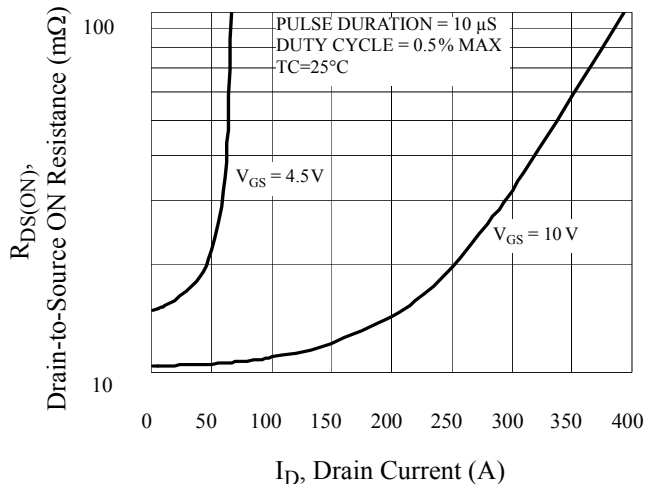


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

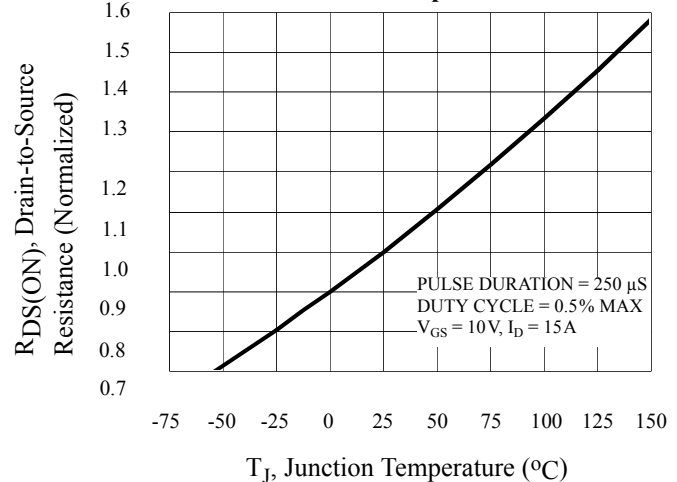


Figure 11. Typical Breakdown Voltage vs Junction Temperature

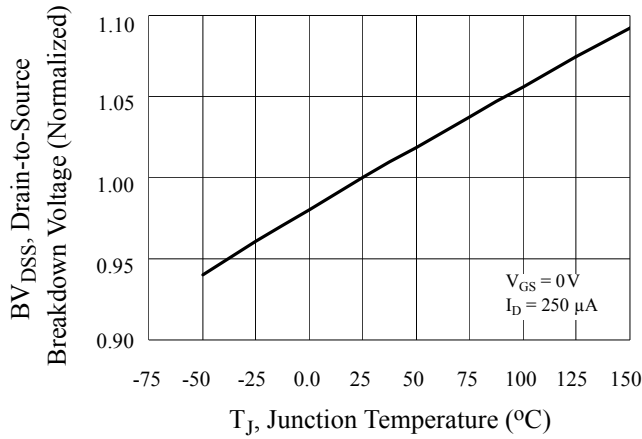
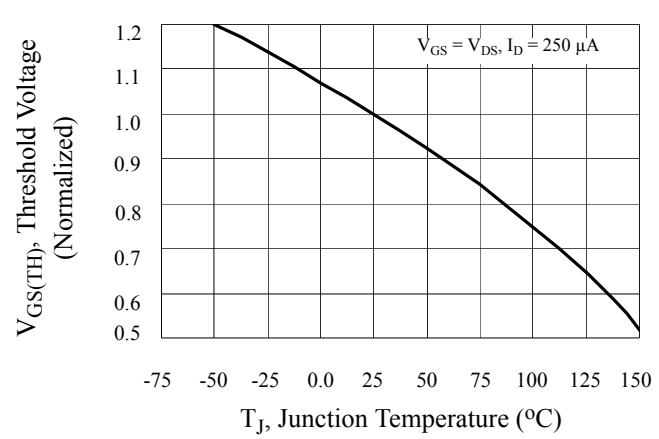


Figure 12. Typical Threshold Voltage vs Junction Temperature



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Figure 13. Maximum Forward Bias Safe Operating Area

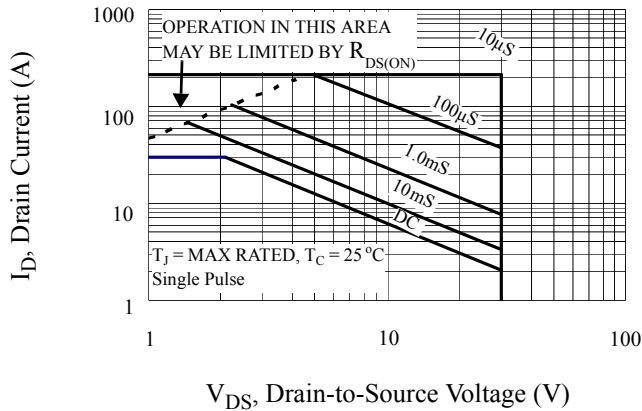


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

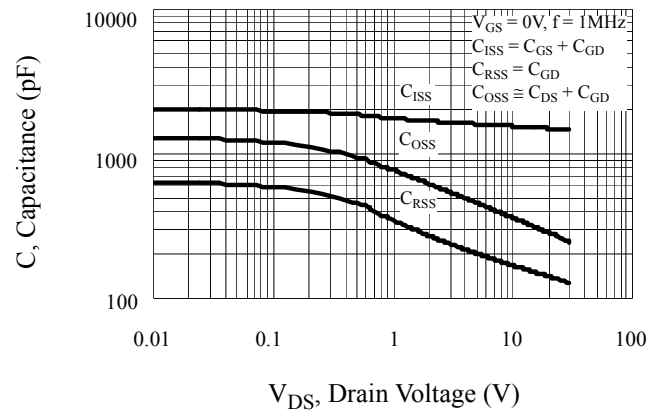


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

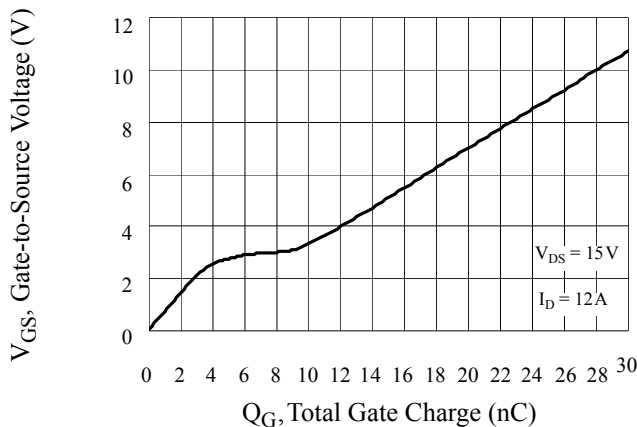
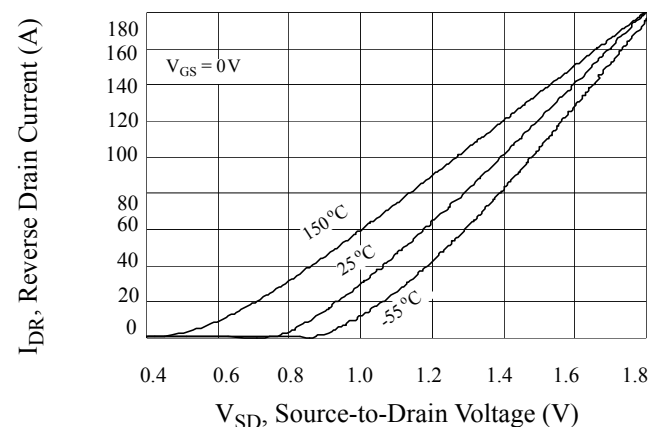
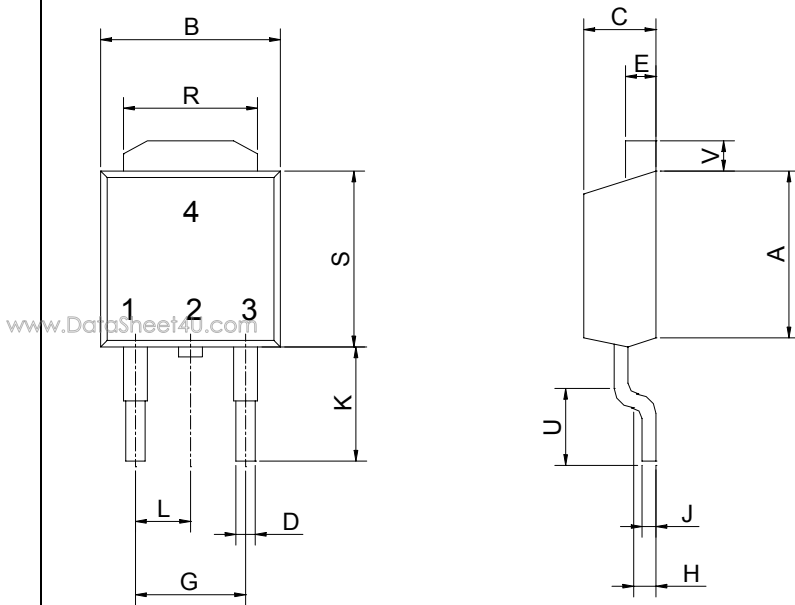


Figure 16. Typical Body Diode Transfer Characteristics



PACKAGE DIMENSION

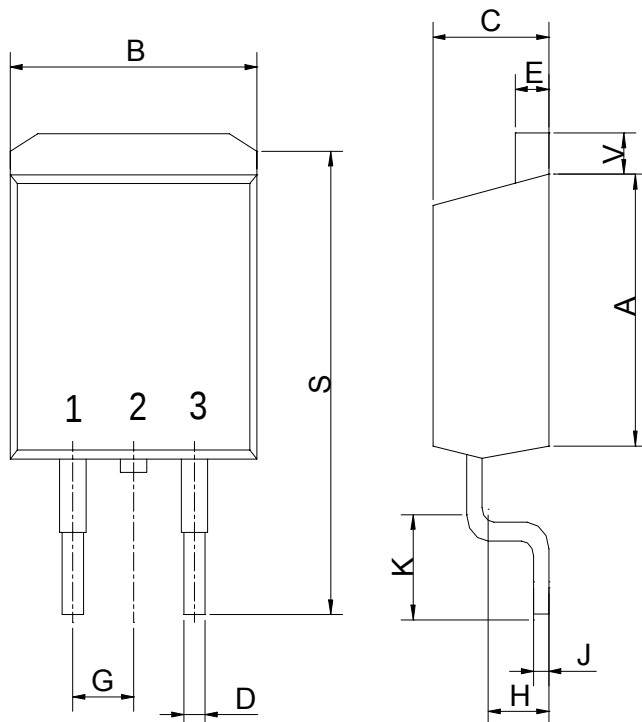
TO-252



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

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