

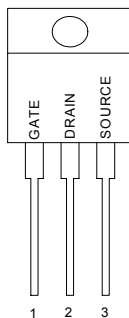
### APPLICATION

- ◆ DC motor control
- ◆ UPS
- ◆ Class D Amplifier

$V_{DSS}$	$R_{DS(ON)}$ Typ.	$I_D$
60V	15.8m $\Omega$	60A

### PIN CONFIGURATION

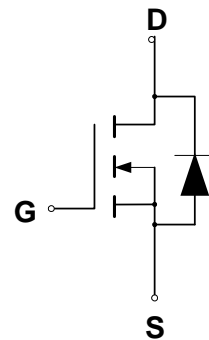
TO-220  
Front View



### FEATURES

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

### SYMBOL



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Source Voltage (Note 1)	$V_{DSS}$	60	V
Drain to Current - Continuous $T_c = 25^\circ\text{C}$ , $V_{GS}@10\text{V}$	$I_D$	60	A
- Continuous $T_c = 100^\circ\text{C}$ , $V_{GS}@10\text{V}$	$I_D$	43	
- Pulsed $T_c = 25^\circ\text{C}$ , $V_{GS}@10\text{V}$ (Note 2)	$I_{DM}$	241	
Gate-to-Source Voltage - Continue	$V_{GS}$	$\pm 20$	V
Total Power Dissipation	$P_D$	150	W
Derating Factor above 25		1.0	W/
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	
Single Pulse Avalanche Energy $L=144\mu\text{H}$ , $I_D=40\text{Amps}$	$E_{AS}$	500	mJ
Maximum Lead Temperature for Soldering Purposes	$T_L$	300	
Maximum Package Body for 10 seconds	$T_{PKG}$	260	
Pulsed Avalanche Rating	$I_{AS}$	60	A

### THERMAL RESISTANCE

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
$R_{\theta JC}$	Junction-to-case			1.0	/W	Water cooled heatsink, $P_D$ adjusted for a peak junction temperature of +175
$R_{\theta JA}$	Junction-to-ambient			62	/W	1 cubic foot chamber, free air

### ORDERING INFORMATION

Part Number	Package
CMT60N06	TO-220

### ELECTRICAL CHARACTERISTICS

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

		CMT60N06			
Characteristic	Symbol	Min	Typ	Max	Units
OFF Characteristics					
Drain-to-Source Breakdown Voltage (V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA)	V <sub>DSS</sub>	60			V
Breakdown Voltage Temperature Coefficient (Reference to 25 °C, I <sub>D</sub> = 250 μA)	V <sub>DSS</sub> /ΔT <sub>J</sub>		0.069		mV/°C
Drain-to-Source Leakage Current (V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 25 °C) (V <sub>DS</sub> = 48 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 150 °C)	I <sub>DSS</sub>			25 250	μA
Gate-to-Source Forward Leakage (V <sub>GS</sub> = 20 V)	I <sub>GSS</sub>			100	nA
Gate-to-Source Reverse Leakage (V <sub>GS</sub> = -20 V)	I <sub>GSS</sub>			-100	nA
ON Characteristics					
Gate Threshold Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA)	V <sub>GS(th)</sub>	1.0	2.0	3.0	V
Static Drain-to-Source On-Resistance (Note 4) (V <sub>GS</sub> = 10 V, I <sub>D</sub> = 60A)	R <sub>DS(on)</sub>		15.8	18	mΩ
Forward Transconductance (V <sub>DS</sub> = 15 V, I <sub>D</sub> = 60A) (Note 4)	g <sub>FS</sub>		36		S
Dynamic Characteristics					
Input Capacitance	(V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz)	C <sub>iss</sub>		1430	pF
Output Capacitance		C <sub>oss</sub>		420	pF
Reverse Transfer Capacitance		C <sub>rss</sub>		88	pF
Total Gate Charge (V <sub>GS</sub> = 10 V)	(V <sub>DS</sub> = 30 V, I <sub>D</sub> = 60 A, V <sub>GS</sub> = 10 V) (Note 5)	Q <sub>g</sub>		37.7	nC
Gate-to-Source Charge		Q <sub>gs</sub>		8.4	nC
Gate-to-Drain (“Miller”) Charge		Q <sub>gd</sub>		9.8	nC
Resistive Switching Characteristics					
Turn-On Delay Time	(V <sub>DD</sub> = 30 V, I <sub>D</sub> = 60 A, V <sub>GS</sub> = 10 V, R <sub>G</sub> = 9.1Ω) (Note 5)	t <sub>d(on)</sub>		12.1	ns
Rise Time		t <sub>rise</sub>		64	ns
Turn-Off Delay Time		t <sub>d(off)</sub>		69	ns
Fall Time		t <sub>fall</sub>		39	ns
Source-Drain Diode Characteristics					
Continuous Source Current (Body Diode)	Integral pn-diode in MOSFET	I <sub>S</sub>		60	A
Pulse Source Current (Body Diode)		I <sub>SM</sub>		241	A
Diode Forward On-Voltage	(I <sub>S</sub> = 60 A, V <sub>GS</sub> = 0 V)	V <sub>SD</sub>		1.5	V
Reverse Recovery Time	(I <sub>F</sub> = 60A, V <sub>GS</sub> = 0 V, d <sub>I</sub> /d <sub>t</sub> = 100A/μs)	t <sub>rr</sub>		55	ns
Reverse Recovery Charge		Q <sub>rr</sub>		110	nC



# CMT60N06

## N-CHANNEL Logic Level Power MOSFET

---

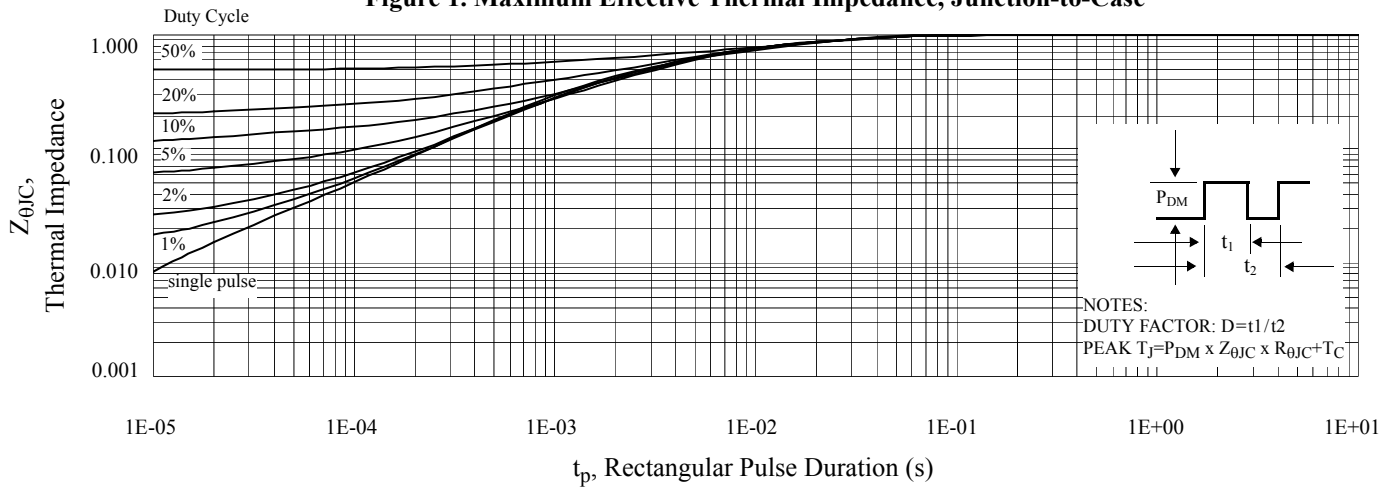
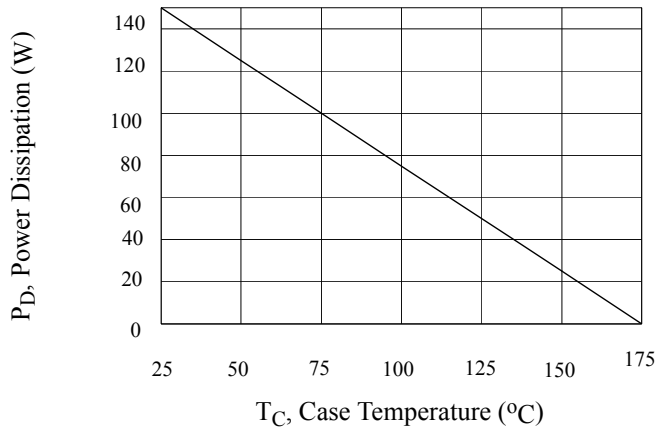
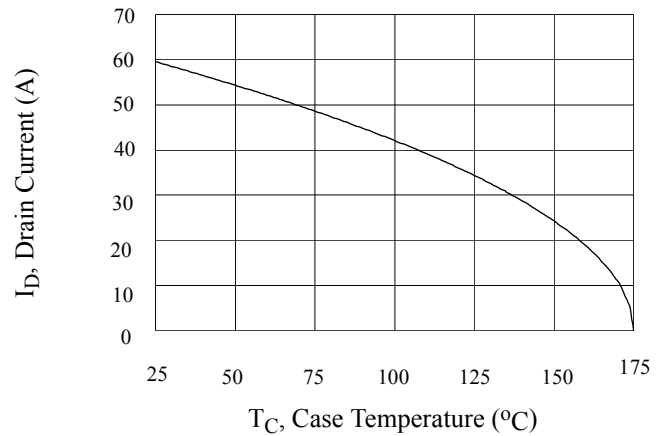
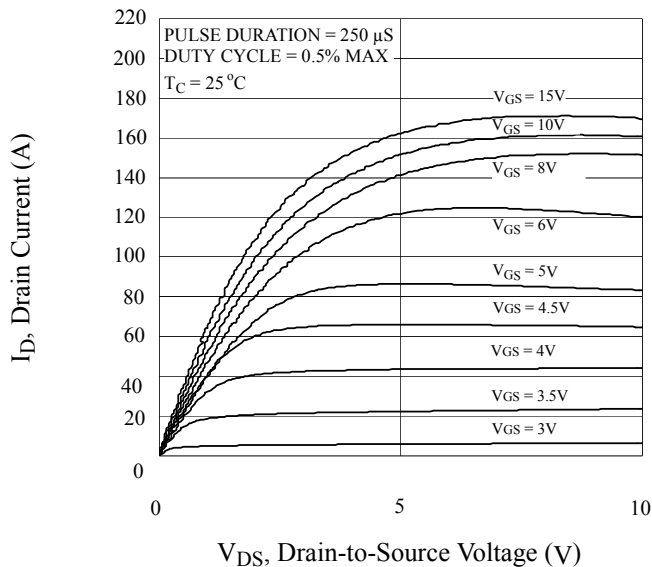
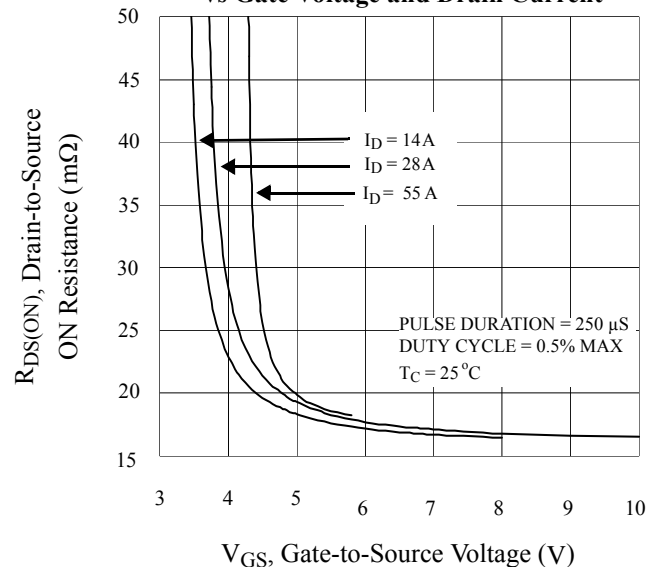
Note 1:  $T_J = +25$  to  $+175$

Note 2: Repetitive rating; pulse width limited by maximum junction temperature.

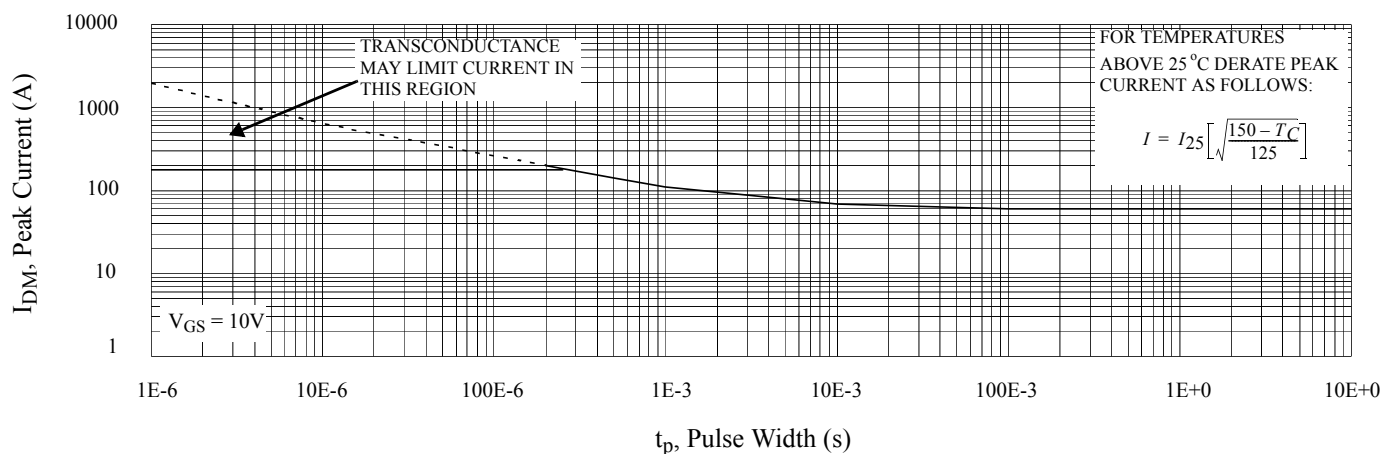
Note 3:  $I_{SD} = 60A$ ,  $di/dt \leq 100A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ ,  $T_J = +175$

Note 4: Pulse width  $\leq 250\mu s$ ; duty cycle  $\leq 2\%$

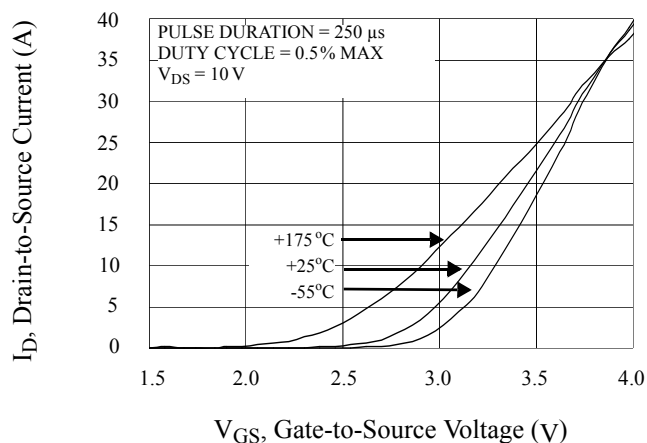
Note 5: Essentially independent of operating temperature.

**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**


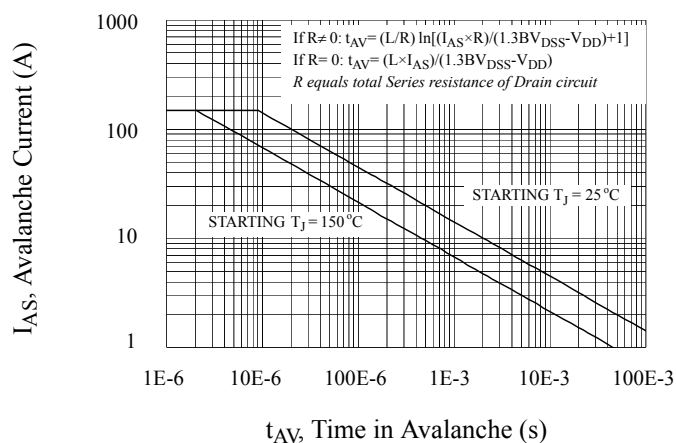
**Figure 6. Maximum Peak Current Capability**



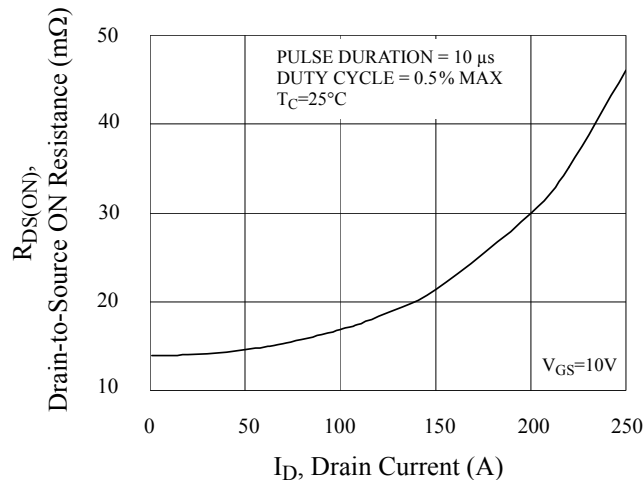
**Figure 7. Typical Transfer Characteristics**



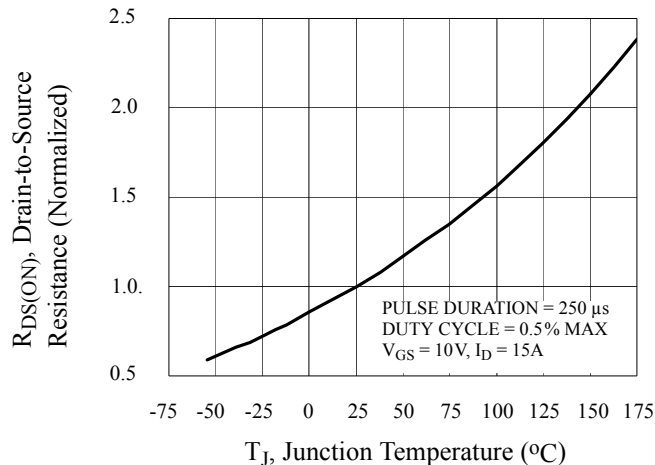
**Figure 8. Unclamped Inductive Switching Capability**



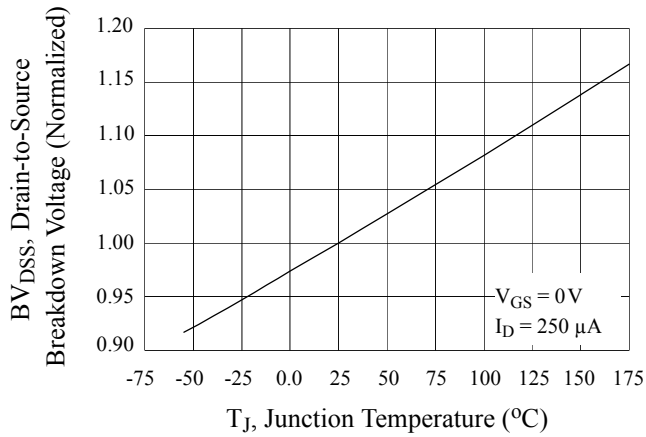
**Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current**



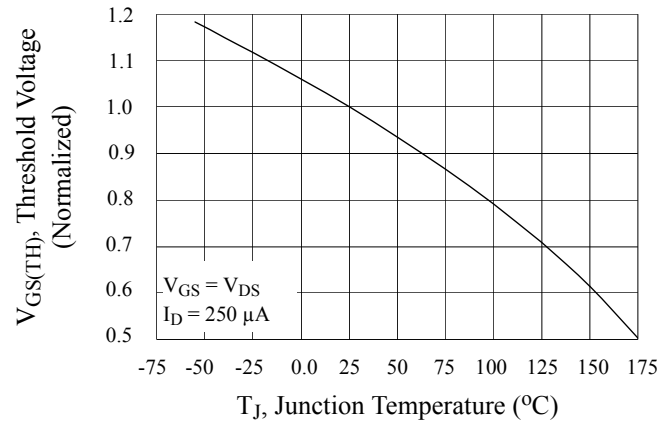
**Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature**



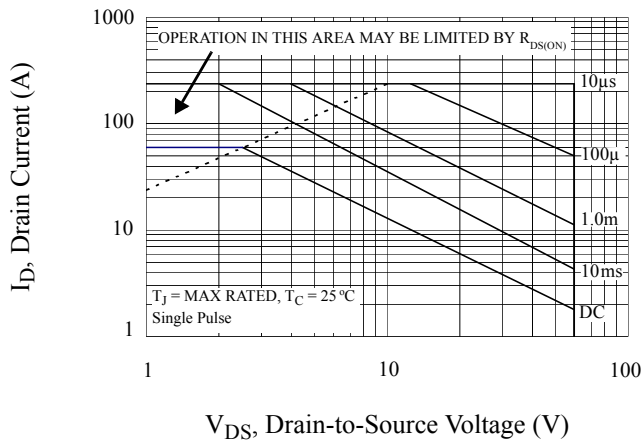
**Figure 11. Typical Breakdown Voltage vs Junction Temperature**



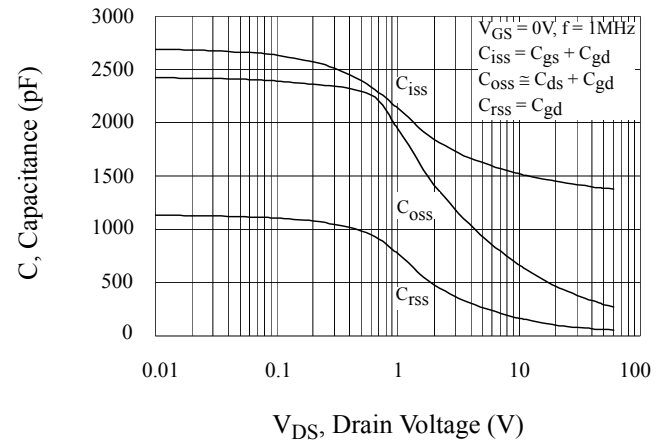
**Figure 12. Typical Threshold Voltage vs Junction Temperature**



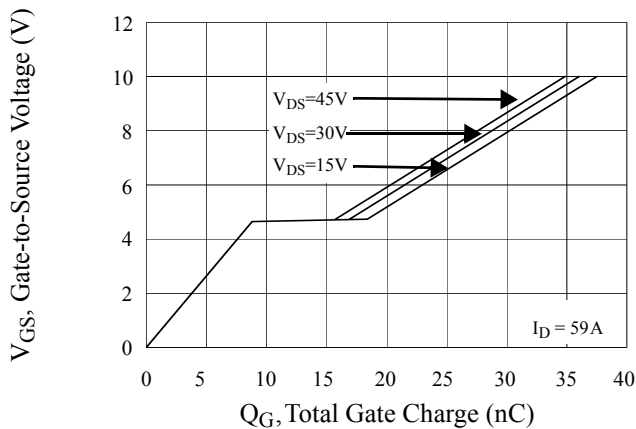
**Figure 13. Maximum Forward Bias Safe Operating Area**



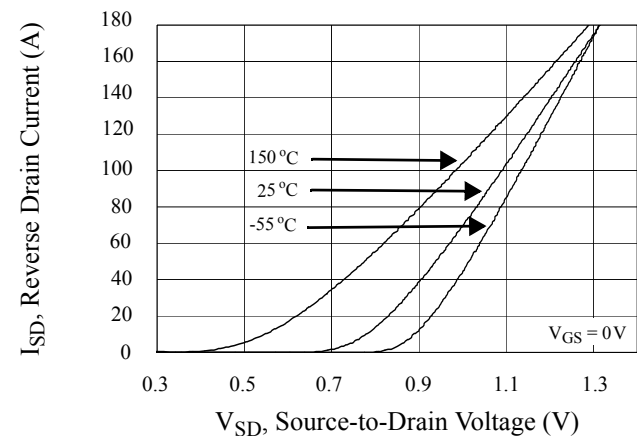
**Figure 14. Typical Capacitance vs Drain-to-Source Voltage**



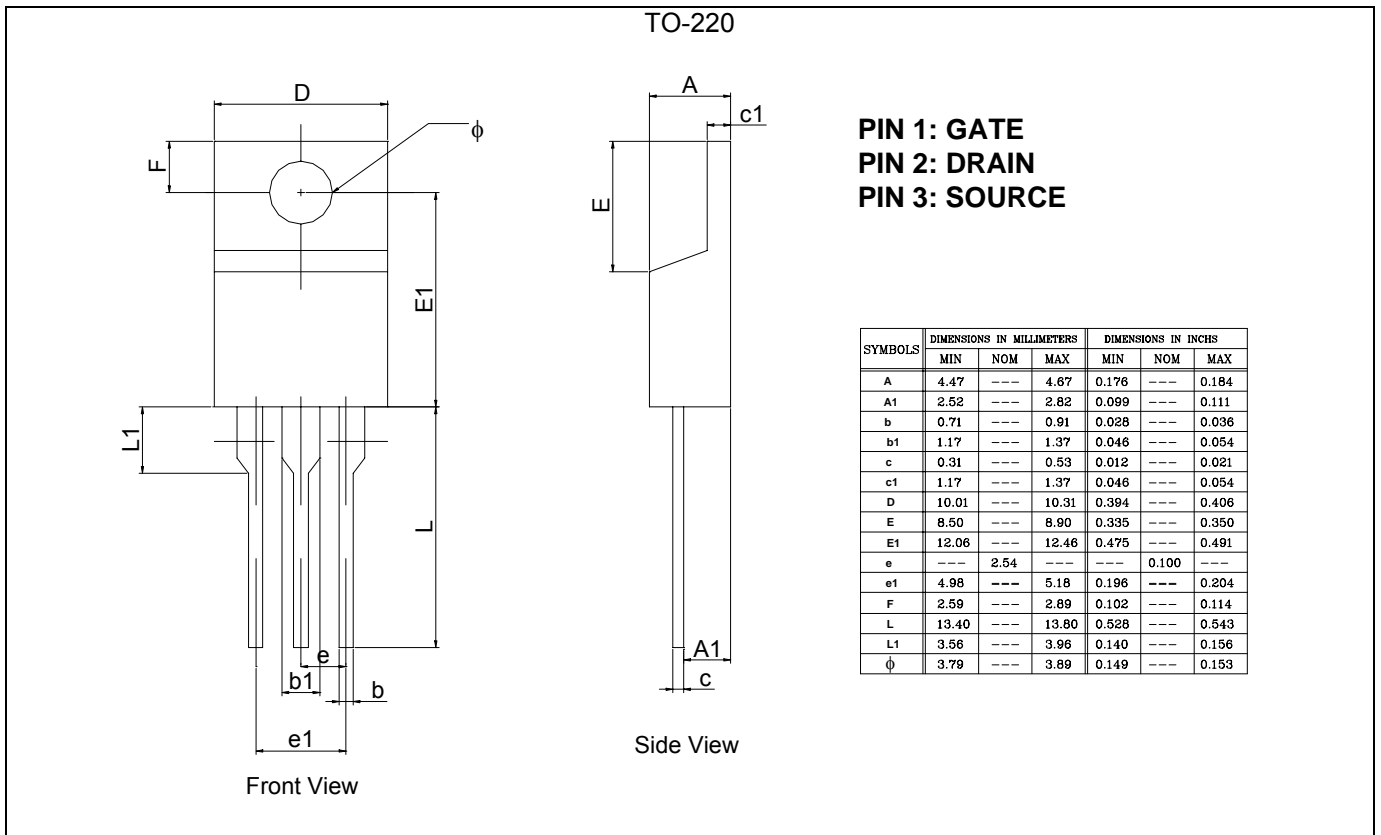
**Figure 15. Typical Gate Charge vs Gate-to-Source Voltage**



**Figure 16. Typical Body Diode Transfer Characteristics**



### PACKAGE DIMENSION



## IMPORTANT NOTICE

Champion Microelectronic Corporation (CMC) reserves the right to make changes to its products or to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

A few applications using integrated circuit products may involve potential risks of death, personal injury, or severe property or environmental damage. CMC integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life-support applications, devices or systems or other critical applications. Use of CMC products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

### HsinChu Headquarter

---

5F-1, No. 11, Park Avenue II,  
Science-Based Industrial Park,  
HsinChu City, Taiwan  
TEL: +886-3-567 9979  
FAX: +886-3-567 9909

### Sales & Marketing

---

11F, No. 306-3, SEC. 1, Ta Tung Road,  
Hsichih, Taipei Hsien 221, Taiwan  
TEL: +886-2-8692 1591  
FAX: +886-2-8692 1596

---