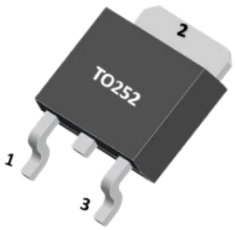
■ DESCRIPTION

The QC80N06 is a N-channel enhancement mode power MOSFET using our advanced technology to provide customers with a minimum on-state resistance and high switching speed. It can also withstand high energy pluse in the avalanche and commutation mode.

TheQC80N06 is suitable for active power factor correction, high efficient switched mode power supplies and electronic lamp ballast based on half bridge topology, etc.

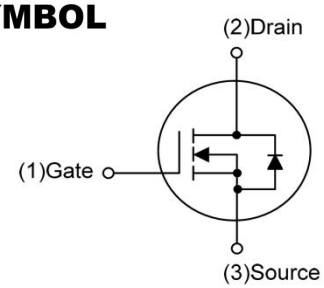




■ FEATURE

* $R_{DS(ON)}$ ≤7mΩ @ V_{GS}=10V, I_D=40A
  $R_{DS(ON)}$ ≤9mΩ @ V_{GS}=4.5V, I_D=40A
* High switching speed
* Improved dv/dt capability

SYMBOL



■ ABSOLUTE MAXIMUM RATINGS(T_A=25°C, unless otherwise specified.)

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate Source Voltage		±20	V
I_D	Continuous Drain Current		80	A
I_{DM}	Pulsed Drain Current (Note 3)		160	A
E_{AS}	Single Pulsed Avalanche Energy(Note 4)		100	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 5)		3.2	V/nS
PD	Power Dissipation	TO-252	58	W
		TO-220F	80	
TJ	Storage Temperature		150	°C
TSTG	Thermal Resistance Fr .0om Junction To Ambient		-55~150	°C
θ_{JA}	Junction to Ambient	TO-252	110	°C/W
		TO-220F	75	
θ_{JC}	Junction to Case(Note 6)	TO-252	2.2	°C/W
		TO-220F	1.88	

Notes: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Drain current limited by maximum junction temperature.
3. Repetitive Rating: Pulse width limited by maximum junction temperature.
4. L = 0.1mH, I_{AS} = 45A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C.
5. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

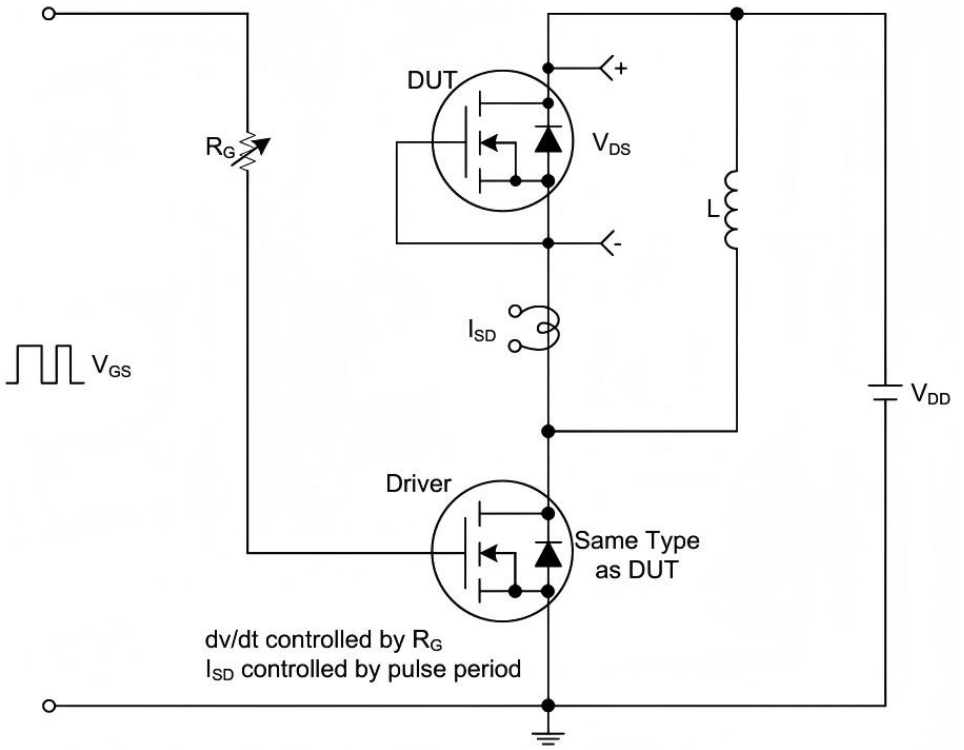
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

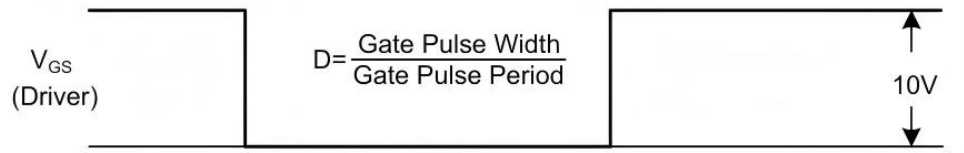
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	60			V
Zero gate voltage drain current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Static drain-source on-sate resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A			7.0	mΩ
		V_{GS}=4.5V, I_D=40A			9.0	
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS},I_D=250μA	1.0		3.0	V
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V,V_{DS}=25V f=1.0MHz		5400		pF
Output Capacitance	C_{OSS}			410		pF
Reverse Transfer Capacitance	C_{RSS}			340		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	V_{DS}=48V,V_{GS}=10V I_D=80A,I_G=1mA (Note 1.2)		130		nC
Gate-source charge	Qgs			19		
Gate-drain charge	Qgd			36		
Turn-On Delay Time	td(on)	V_{DS}=30V,I_D=80A V_{GS}=10V, R_G=3.3Ω (Note 1.2)		17		nS
Turn-On Rise time	tr			20		
Turn-Off Delay Time	td(off)			75		
Turn-Off Fall time	tf			30		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Continuous drain-source diode forward current (Note 1)	I_S				80	A
Pulsed drain-source diode forward current (Note 2)	I_{SM}				160	A
Drain-source diode forward voltage(Note 4)	V_{SD}	I_S=24A,V_{GS}=0V			1.4	V
Reverse Recovery Time	trr	I_S=30A, V_{GS}=0V dI/dt=100A/μs		52		nS
Reverse Recovery Charge	Qrr			152		nC

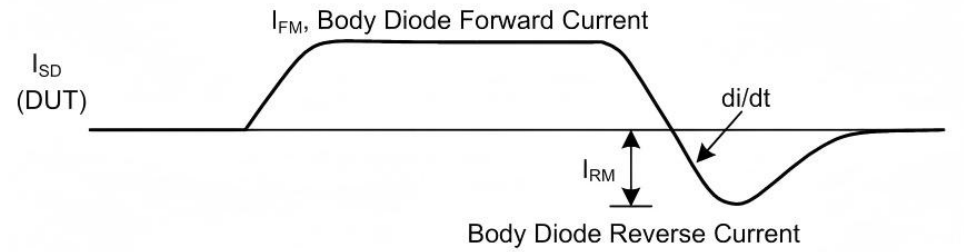
Notes:

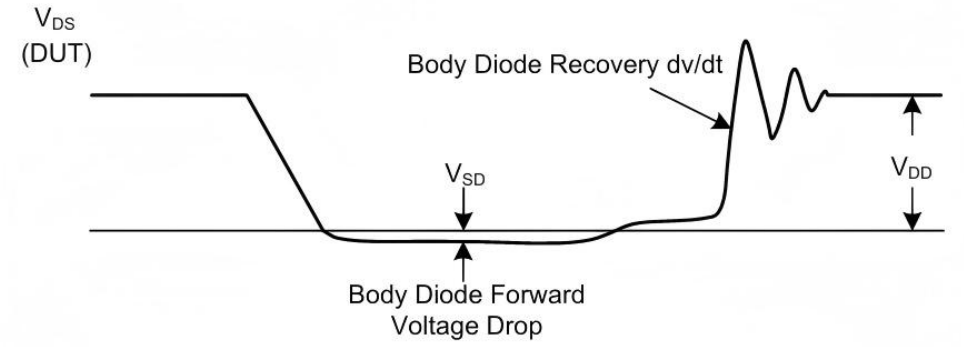
1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Essentially independent of operating temperature typical characteristics.

■ TEST CIRCUITS AND WAVEFORMS



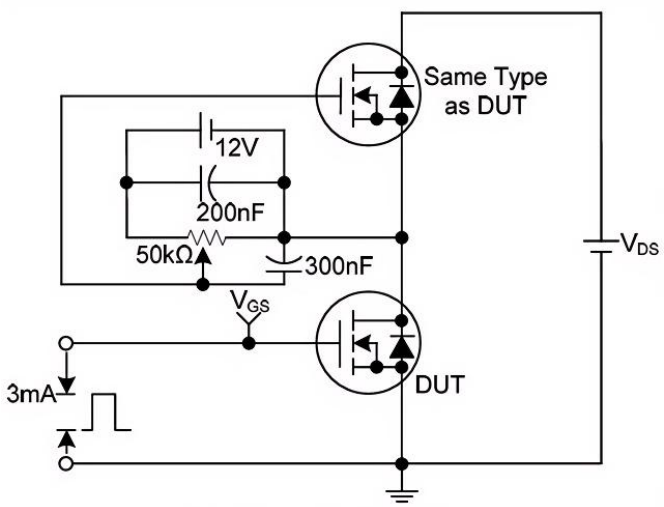




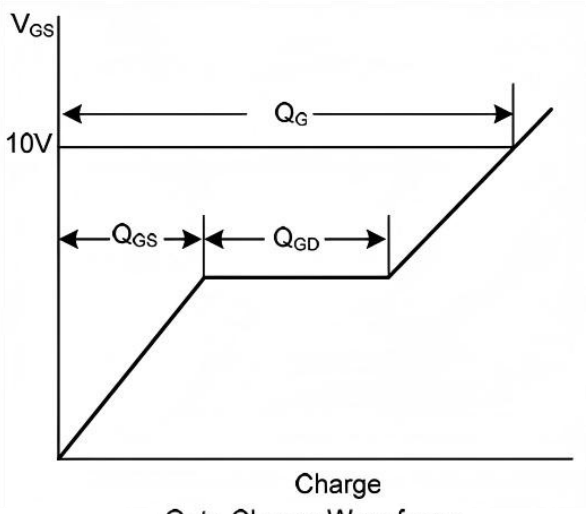


Peak Diode Recovery dv/dt Test Circuit and Waveforms

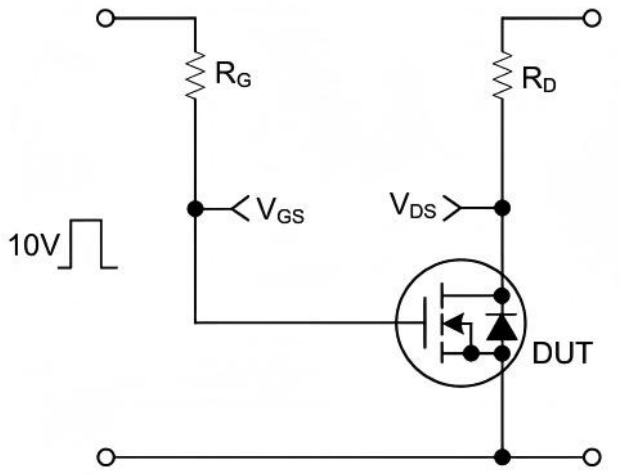
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



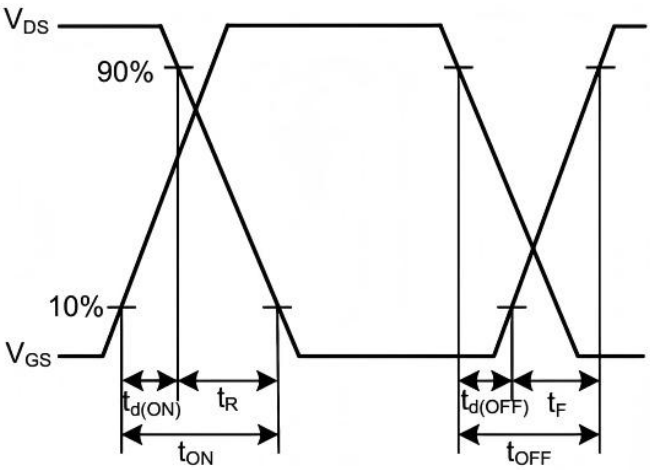
Gate Charge Test Circuit



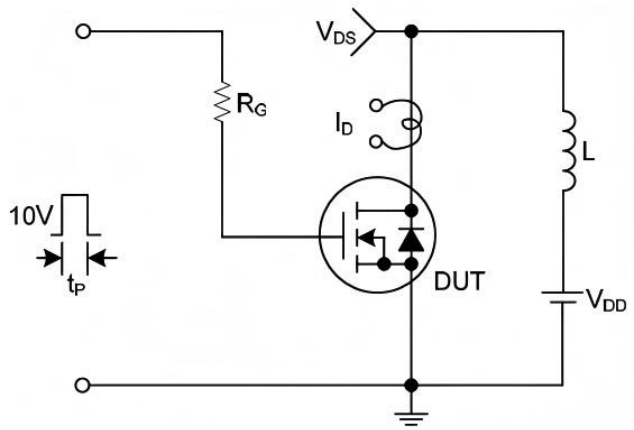
Charge
Gate Charge Waveforms



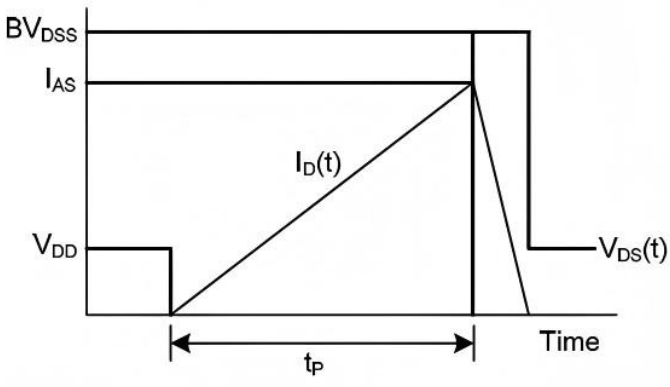
Resistive Switching Test Circuit



Resistive Switching Waveforms



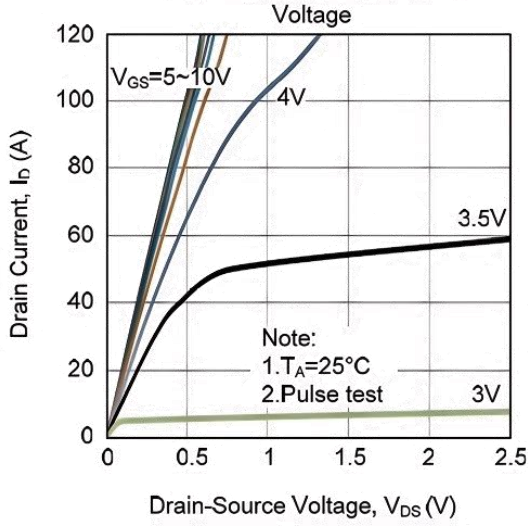
$$E_{AS}=\frac{1}{2}LI_{AS}^{2}\frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$



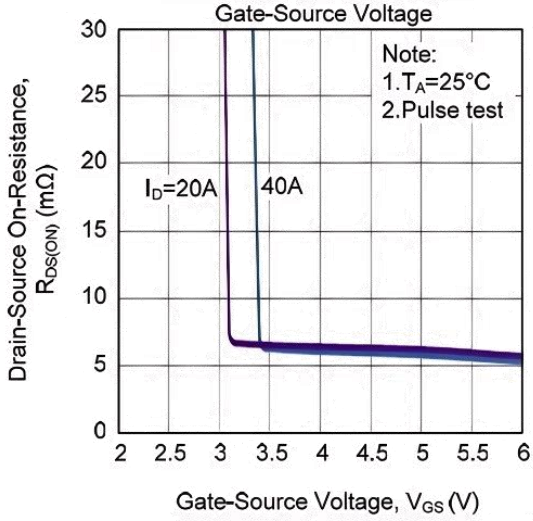
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

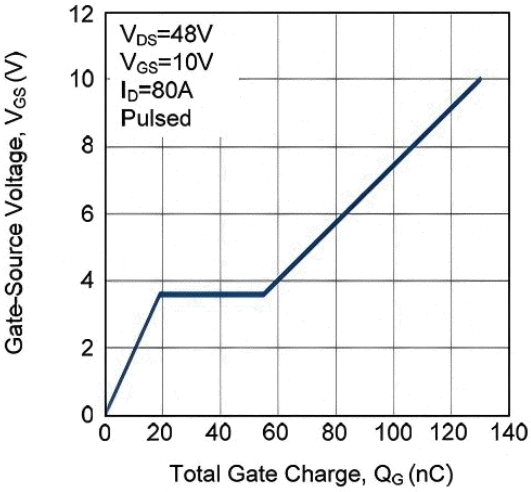
Drain Current vs. Drain-Source Voltage



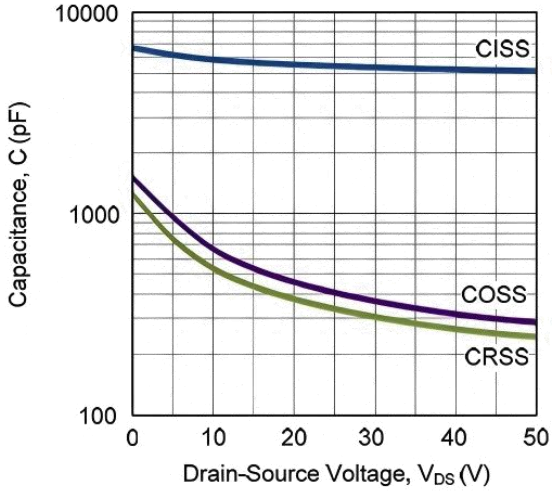
Drain-Source On-Resistance vs. Gate-Source Voltage



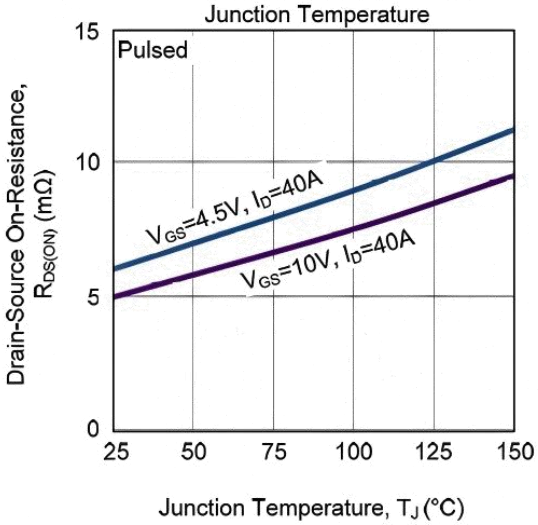
Gate Charge Characteristics



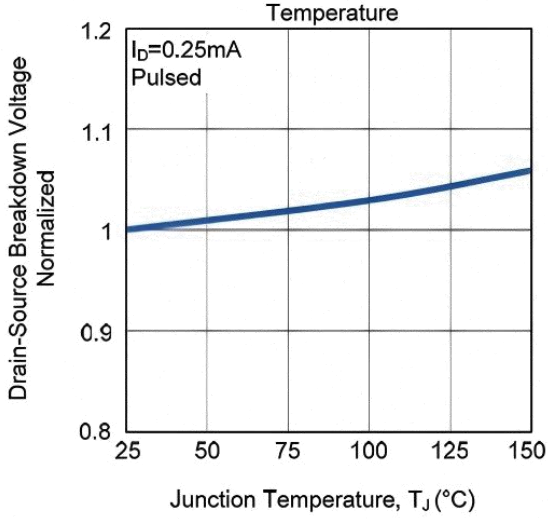
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

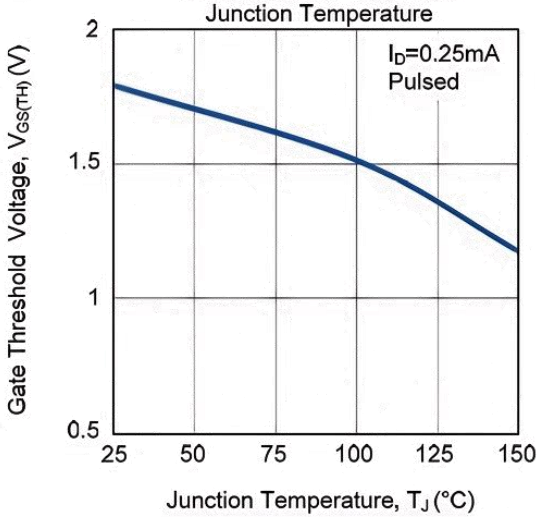


Breakdown Voltage vs. Junction Temperature

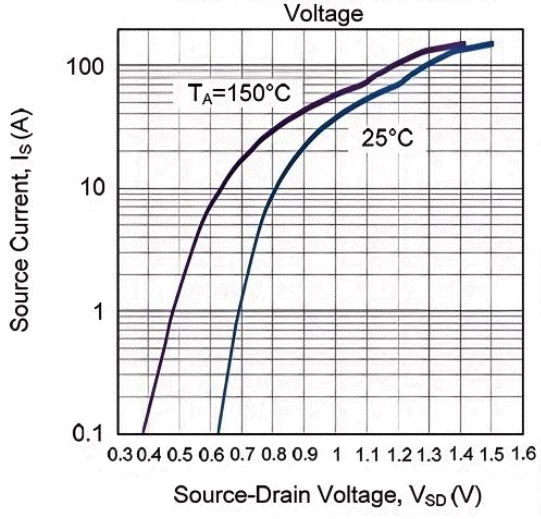


■ TYPICAL CHARACTERISTICS(Con.t)

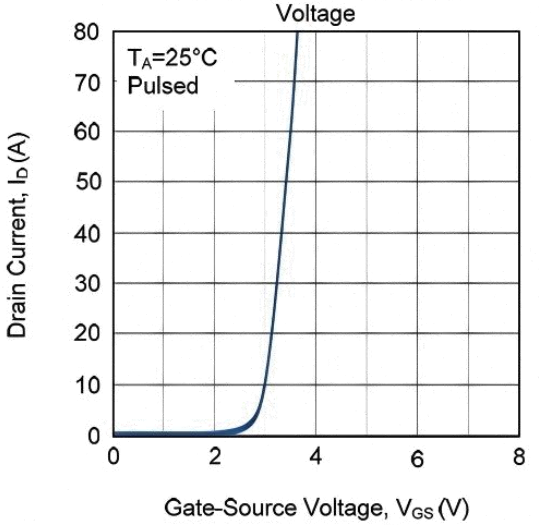
Gate Threshold Voltage vs. Junction Temperature



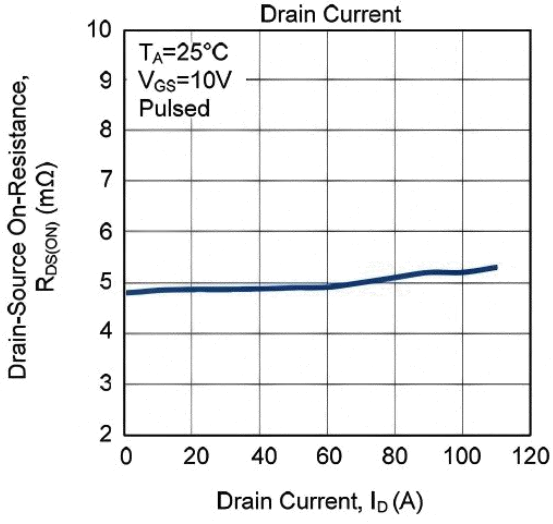
Source Current vs. Source-Drain Voltage



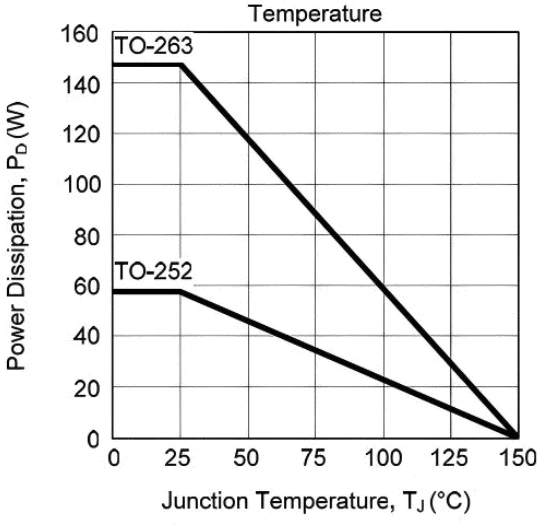
Drain Current vs. Gate-Source Voltage



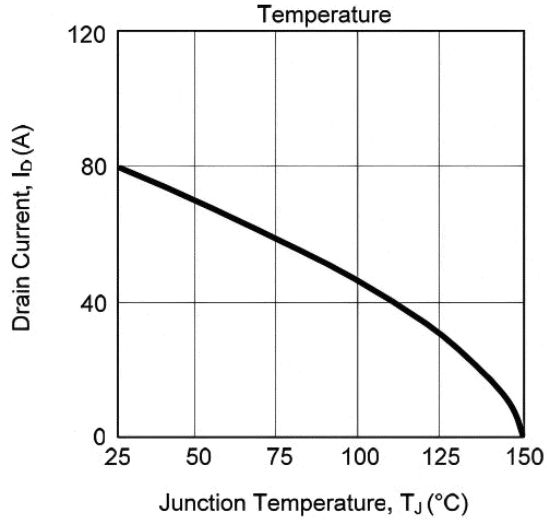
Drain-Source On-Resistance vs. Drain Current



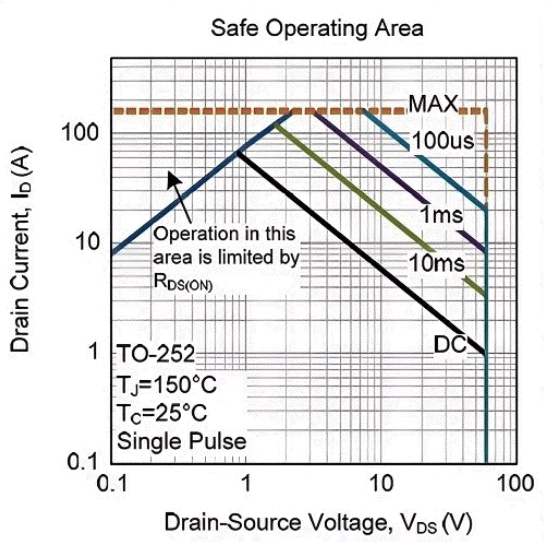
Power Dissipation vs. Junction Temperature



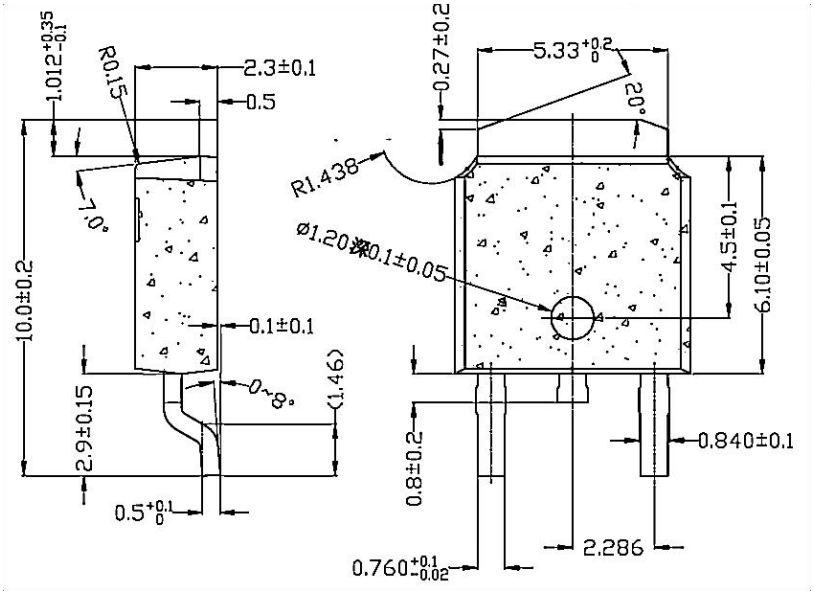
Drain Current vs. Junction Temperature

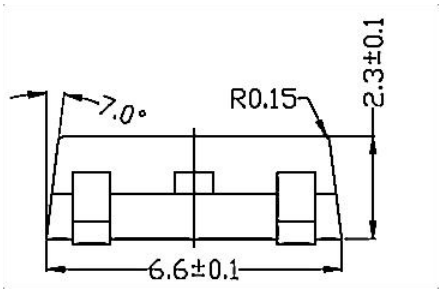


■ TYPICAL CHARACTERISTICS(Con.t)

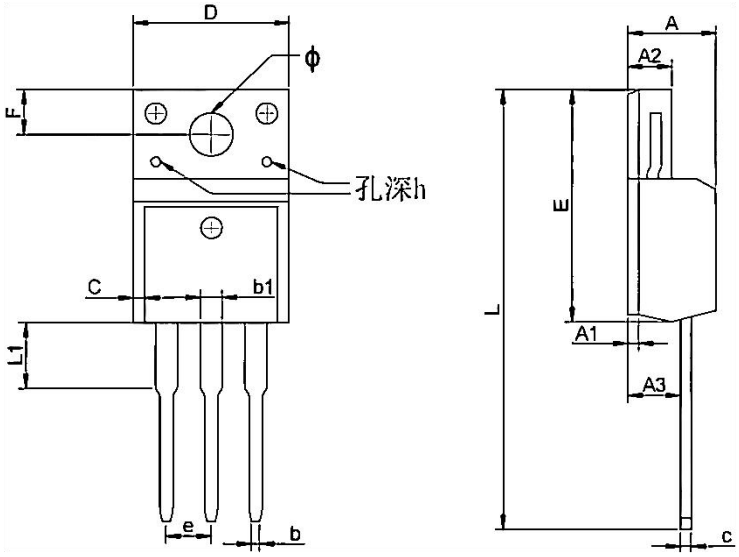


■ TO - 252 PACKAGE OUTLINE DIMENSIONS





■ TO- 220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max	Min	Max
A	4.300	4.750	0.169	0.185
A1	1.830 REF		0.072 REF	
A2	2.300	2.850	0.090	0.112
A3	2.500	2.900	0.098	0.114
b	0.400	0.420	0.016	0.016
b1	1.220	1.280	0.048	0.050
C	0.690	0.720	0.027	0.028
c	0.490	0.510	0.019	0.020
D	9.960	10.200	0.392	0.400
E	15.000	15.950	0.588	0.625
e	2.574 TYP		0.101TYP	
F	3.470 REF		0.136 REF	
y	3.200 REF		0.125 REF	
h	0.000	0.300	0.000	0.012
L	28.780	28.900	1.128	1.133
L1	2.990	3.100	0.117	0.122