

N-Channel Power MOSFET

FEATURES

- Super-Junction technology
- High performance good FOM
- High commutation performance
- 100% UIS & Rg tested
- RoHS Compliant
- Halogen-free

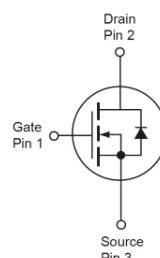
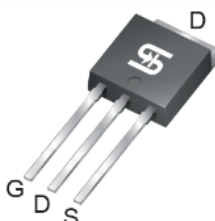
APPLICATIONS

- Switching Power Supply
- Lighting

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{DS} @ T_{j,max}$	650	V
$R_{DS(on)}$ (max)	0.62	Ω
$Q_{g,typ}$	15	nC



TO-251(IPAK)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage	static	V_{GS}	± 20	V
	AC($f > 1\text{Hz}$)		± 30	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	7	A
Pulsed Drain Current (Note 1)		I_{DM}	21	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$		P_D	78	W
Single Pulse Avalanche Energy (Note 2)		E_{AS}	136	mJ
Single Pulse Avalanche Current (Note 2)		I_{AS}	2.3	A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	1.6	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	50	$^\circ\text{C/W}$

Note: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins. $R_{\theta JA}$ shown below for single device operation on FR-4 PCB with a minimum recommended footprint in still air.

ELECTRICAL SPECIFICATIONS (T _A = 25°C unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 3)						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 1mA	BV _{DSS}	600	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 1mA	V _{GS(TH)}	3	4.5	5	V
Gate Body Leakage	V _{GS} = ± 20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = 600V, V _{GS} = 0V	I _{DSS}	--	--	100	μA
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 2.4A	R _{DS(on)}	--	0.58	0.62	Ω
Dynamic (Note 4)						
Total Gate Charge	V _{DS} = 300V, I _D = 7A, V _{GS} = 10V	Q _g	--	15	--	nC
Gate-Source Charge		Q _{gs}	--	4.3	--	
Gate-Drain Charge		Q _{gd}	--	5.8	--	
Input Capacitance	V _{DS} = 300V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	501	--	pF
Output Capacitance		C _{oss}	--	20	--	
Reverse Transfer Capacitance		C _{rss}	--	12	--	
Gate Resistance	f = 1.0MHz	R _g	--	2.5	--	Ω
Switching (Note 5)						
Turn-On Delay Time	V _{DD} = 300V, R _G = 10Ω, I _D = 3.5A, V _{GS} = 10V	t _{d(on)}	--	15	--	ns
Turn-On Rise Time		t _r	--	11	--	
Turn-Off Delay Time		t _{d(off)}	--	37	--	
Turn-Off Fall Time		t _f	--	14	--	
Source-Drain Diode						
Body-Diode Continuous Forward Current		I _S	--	--	7	A
Body-Diode Pulsed Current (Note 1)		I _{SM}	--	--	21	A
Forward Voltage (Note 3)	I _S = 2.4A, V _{GS} = 0V	V _{SD}	--	--	1.5	V
Reverse Recovery Time (Note 4)	I _S = 7A dI _F /dt = 100A/μs	t _{rr}	--	267	--	ns
Reverse Recovery Charge (Note 4)		Q _{rr}	--	3.3	--	μC

Notes:

- Pulse width limited by the maximum junction temperature.
- $L = 50mH, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$.
- Defined by design. Not subject to production test.
- Switching time is essentially independent of operating temperature.

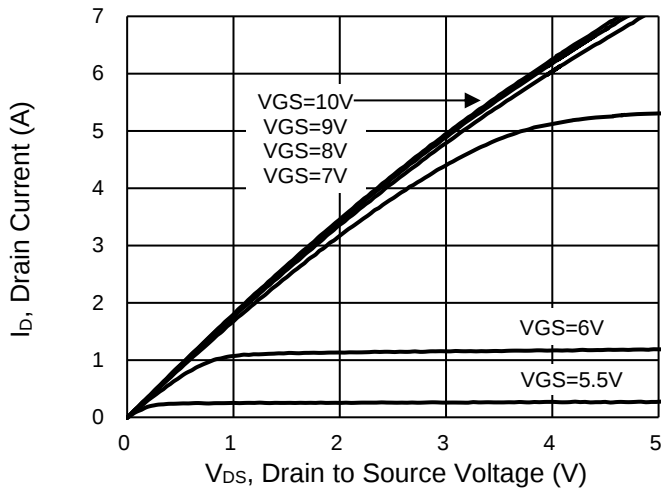
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM60NC620CH C5G	TO-251 (IPAK)	75pcs / Tube

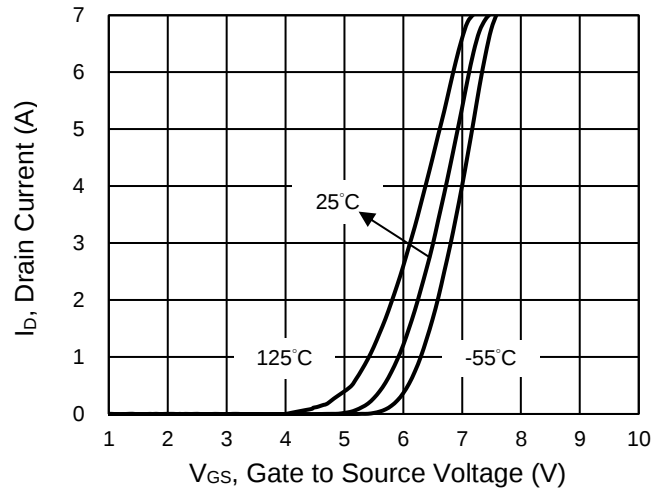
CHARACTERISTICS CURVES

($T_c = 25^\circ\text{C}$ unless otherwise noted)

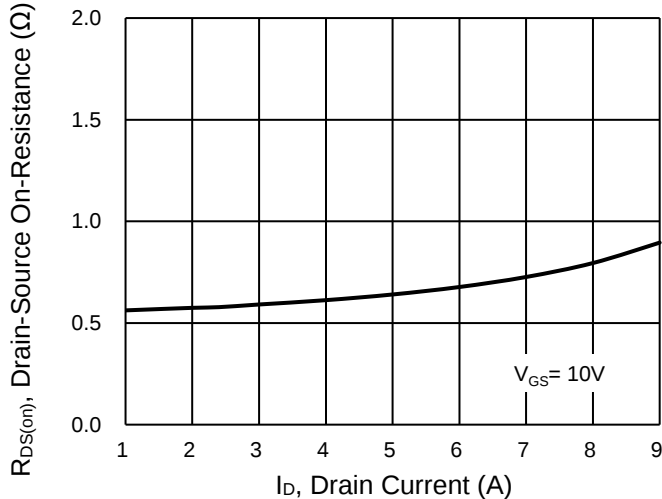
Output Characteristics



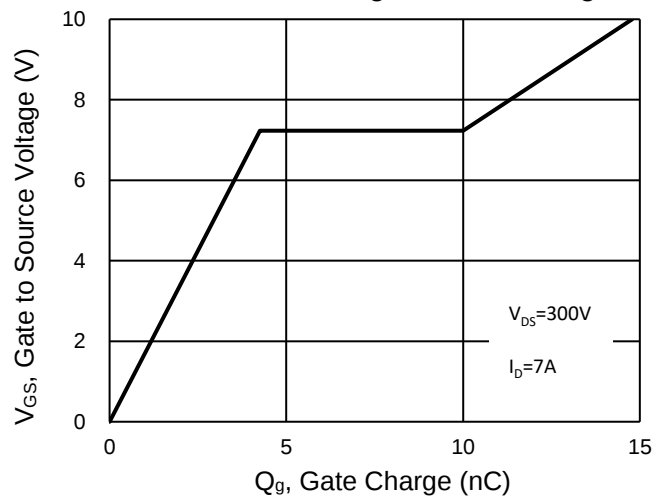
Transfer Characteristics



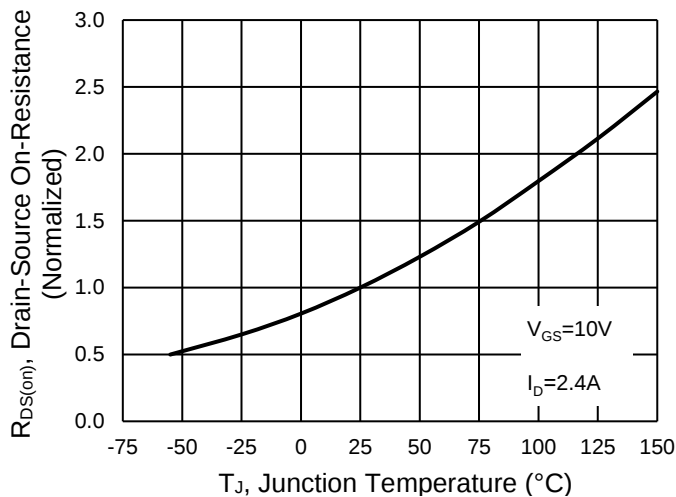
On-Resistance vs. Drain Current



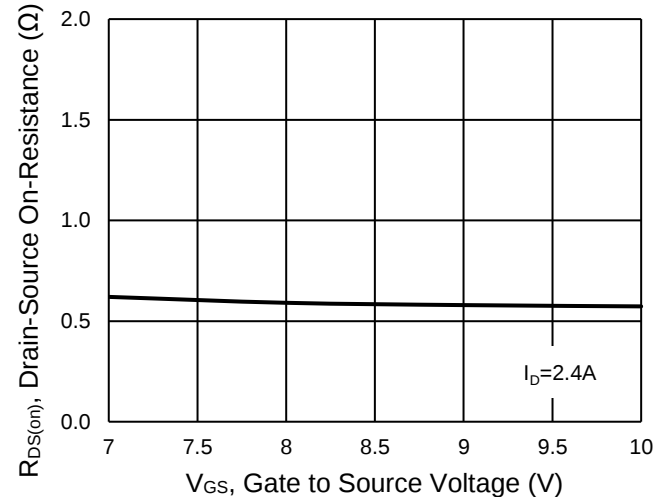
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



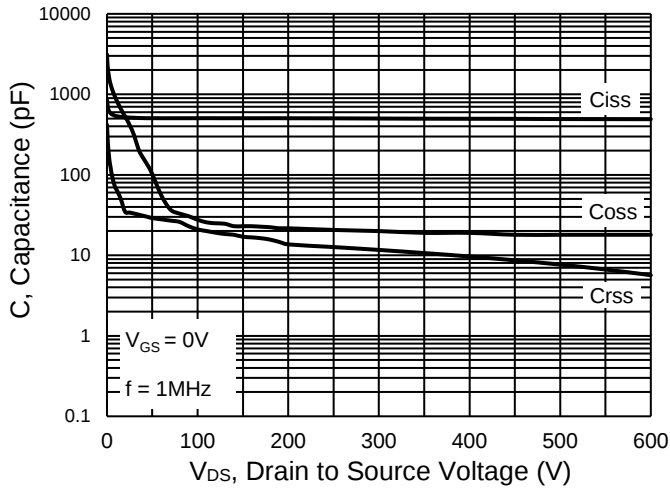
On-Resistance vs. Gate-Source Voltage



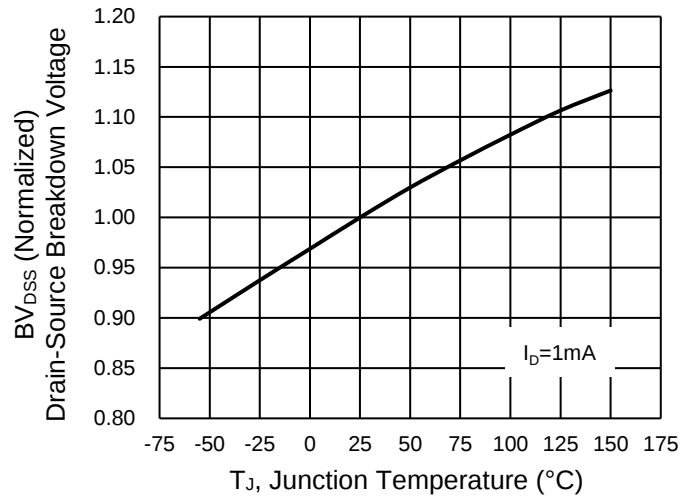
CHARACTERISTICS CURVES

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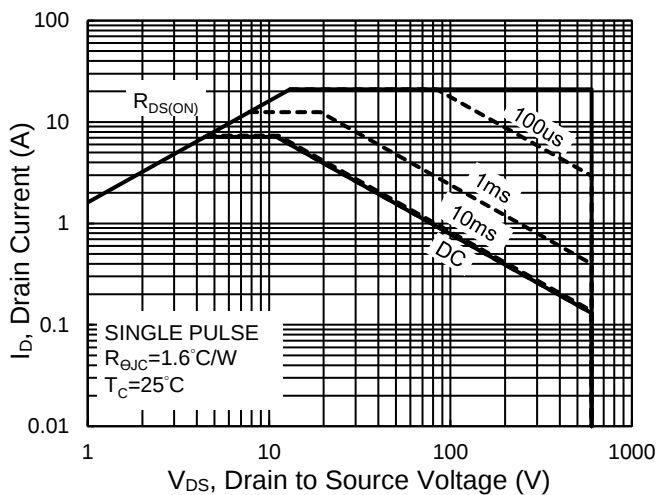
Capacitance vs. Drain-Source Voltage



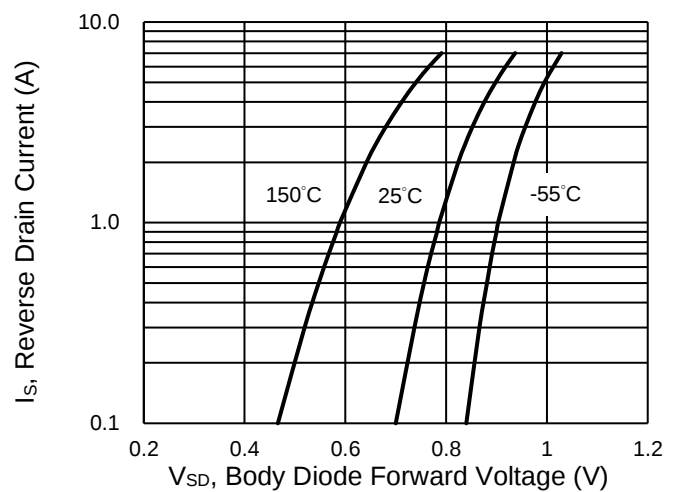
BV_{DSS} vs. Junction Temperature



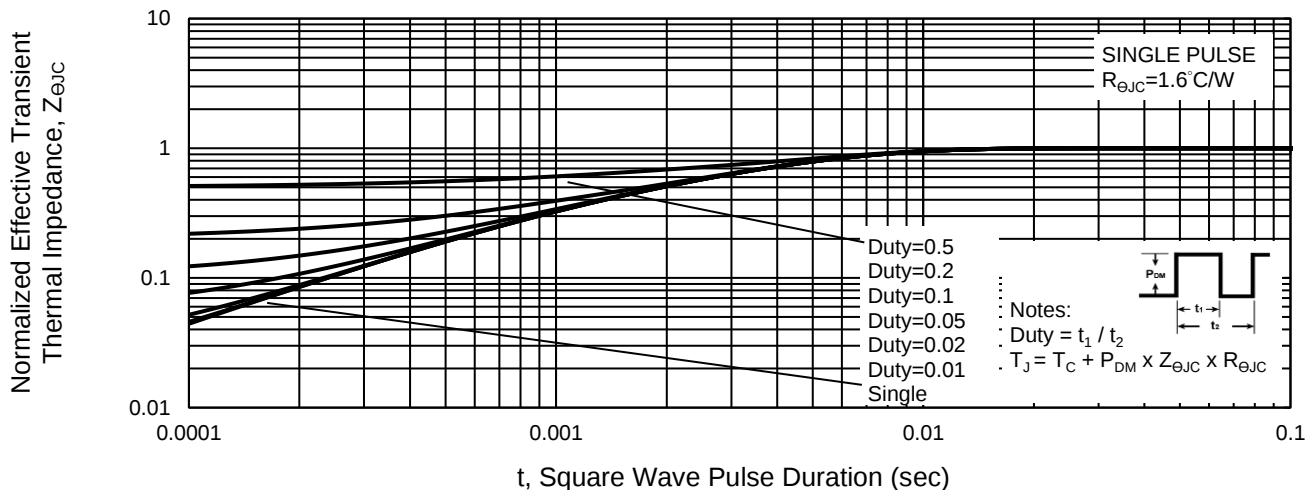
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage

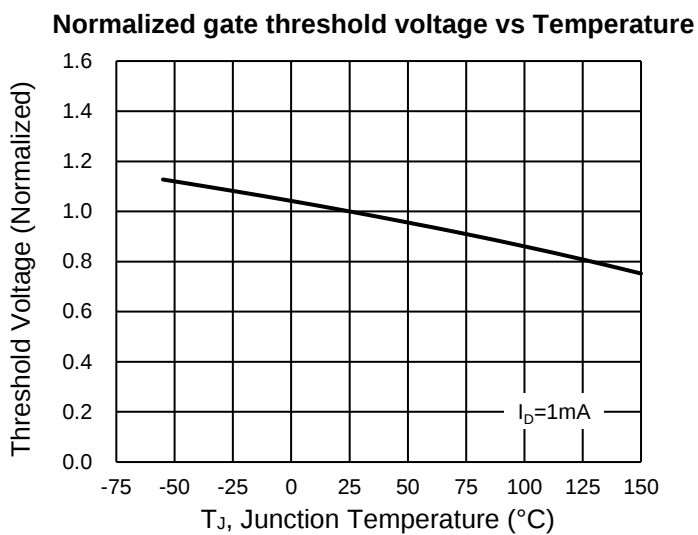
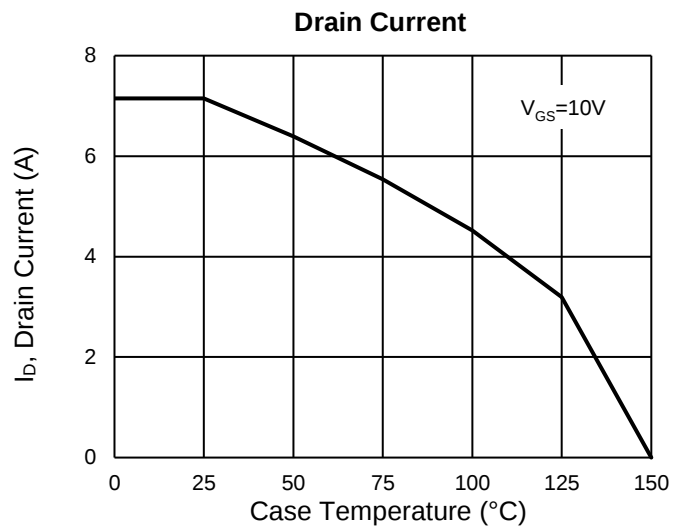
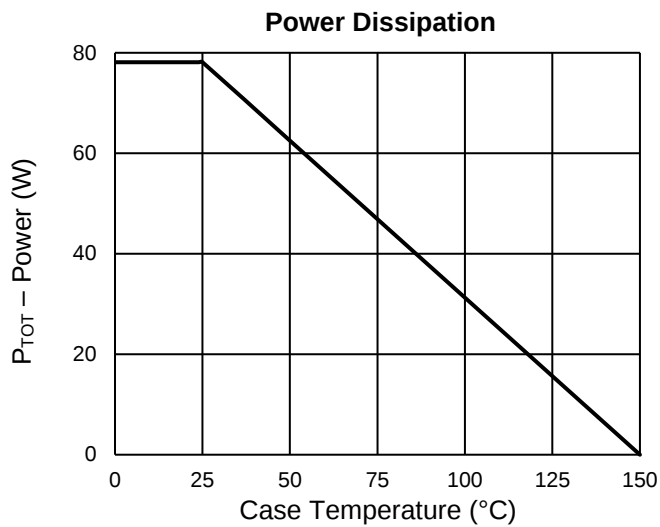


Normalized Thermal Transient Impedance, Junction-to-Case



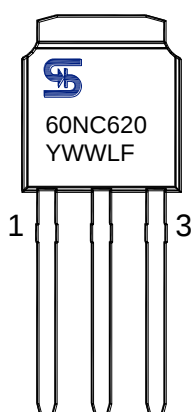
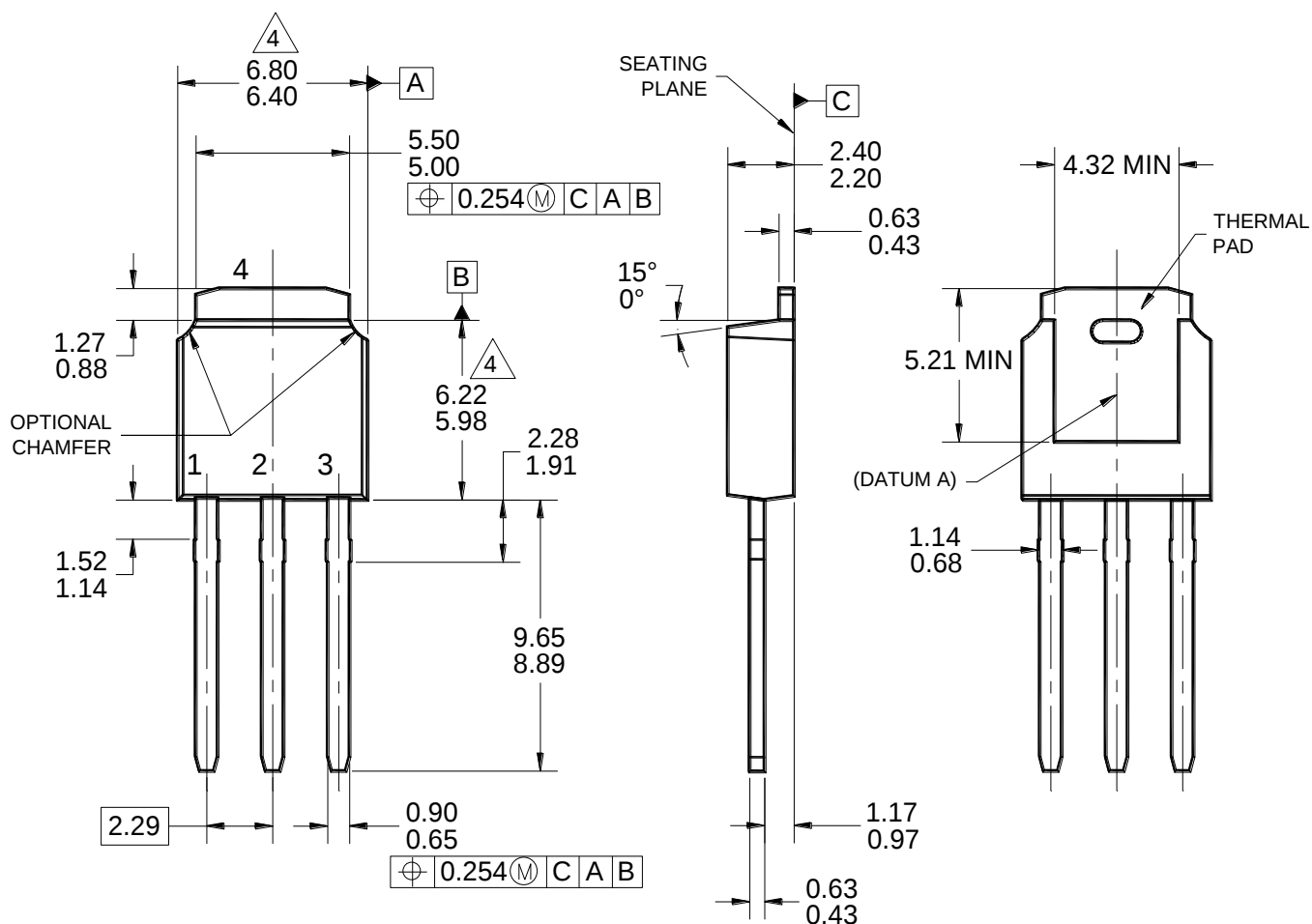
CHARACTERISTICS CURVES

($T_C = 25^\circ\text{C}$ unless otherwise noted)



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-251



MARKING DIAGRAM

60NC620 = Device marking

Y = Year Code

WW = Week Code (01~52)

L = Lot Code (1~9,A~Z)

F = Factory Code

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. THIS CONFORM TO JEDEC PACKAGE REGISTRATION TO-251, VARIATION AA

- 4 MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

5. DWG NO REF: HQ2SD07-IPAK-005 REV A.

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