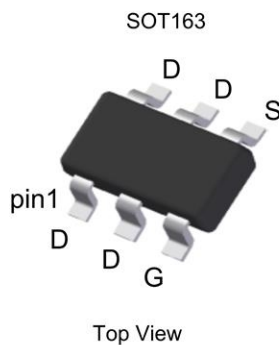## Product Summary

- -20V/-7A
  $R_{DS(ON)} = 22m\Omega(Typ.)@V_{GS} = -4.5V$
  $R_{DS(ON)} = 26m\Omega(Typ.)@V_{GS} = -2.5V$
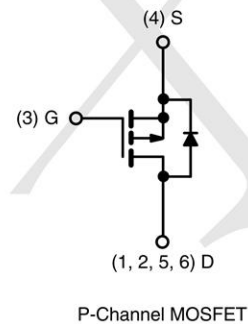
Application

- Battery Pack
- Portable Devices
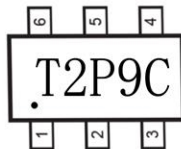
Package and Pin Configuration

SOT163

Top View

Circuit diagram

P-Channel MOSFET

Marking:

T2P9C

Absolute Maximum Ratings (T$_A$=25℃ unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	$T_C = 25°C$	I_D	-7	A
	$T_C = 100°C$		-4.9	
Pulsed Drain Current [Note 1]		I_{DM}	-26	A
Total Power Dissipation	$T_C = 25°C$	P_{DTOT}	1.56	W
Operating Junction Temperature		T_J	150	℃
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	℃

Thermal Characteristic

PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	80	℃/W

Electrical Characteristics (T_A=25℃ unless otherwise noted)

| PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 2)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250µA	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250µA	$V_{GS(TH)}$	-0.4	--	-1.1	V
Gate Body Leakage	V_{GS} = ±12V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = -20V, V_{GS} = 0V	I_{DSS}	--	--	-1	µA
	V_{DS} = -16V, T_J = 125ºC		--	--	-10	
Drain-Source On-State Resistance	V_{GS} = -4.5V, I_D = -5A	$R_{DS(on)}$	--	22	26	mΩ
	V_{GS} = -2.5V, I_D = -4A		--	26	32	
	V_{GS} = -1.8V, I_D = -3A		--	32	40	
Forward Transconductance	V_{DS} = -10V, I_S = -5A	g_{fs}	--	15	--	S
Dynamic (Note 3)						
Total Gate Charge	V_{DS} = -10V, I_D = -5A, V_{GS} =- 4.5V	Q_g	--	19.5	--	nC
Gate-Source Charge		Q_{gs}	--	2	--	
Gate-Drain Charge		Q_{gd}	--	3.6	--	
Input Capacitance	V_{DS} = -15V, V_{GS} = 0V, F = 1.0MHz	C_{iss}	--	1670	--	pF
Output Capacitance		C_{oss}	--	220	--	
Reverse Transfer Capacitance		C_{rss}	--	120	--	
Switching						
Turn-On Delay Time	V_{DD} = -10V, I_D = -1A, V_{GS} = -4.5V, R_{GEN} =25Ω	$t_{d(on)}$	--	10.4	--	ns
Turn-On Rise Time		t_r	--	37.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	89.1	--	
Turn-Off Fall Time		t_f	--	24.6	--	
Source-Drain Diode						
Forward Voltage	V_{GS} = 0V, I_S = -1A	V_{SD}	--	--	-1	V
Continuous Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	-7	A
Pulse Forward Current		I_{SM}	--	--	-26	A

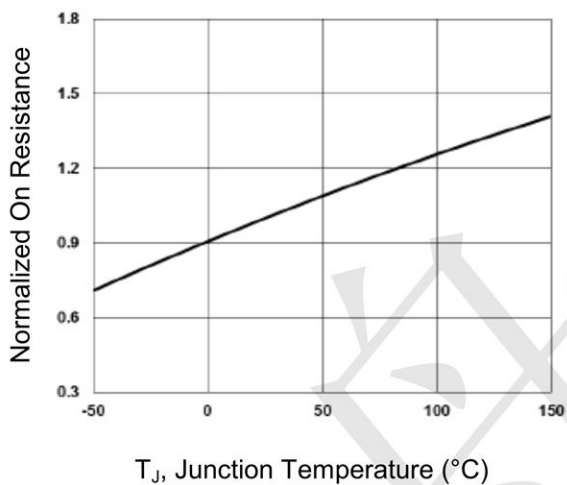## Typical Electrical and Thermal Characteristics

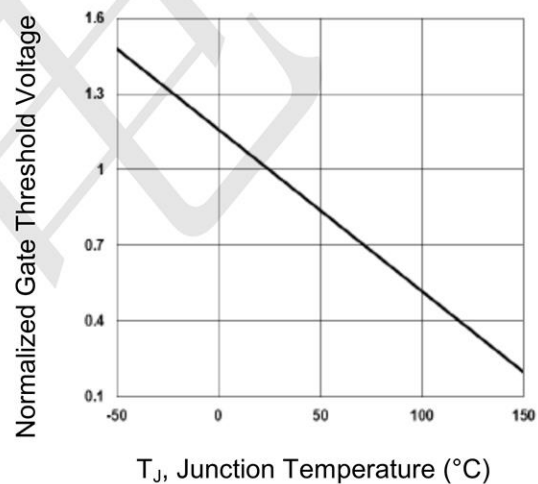### Continuous Drain Current vs. T_C
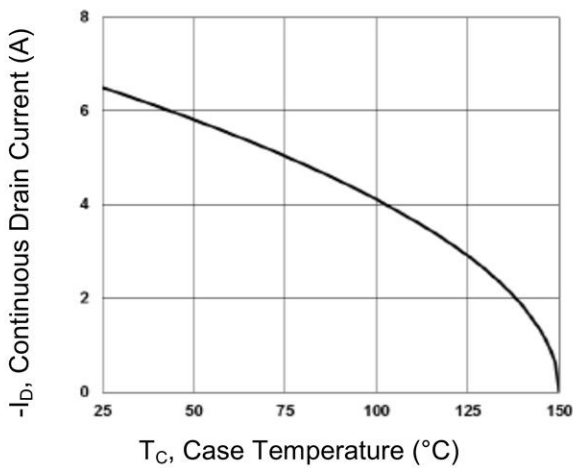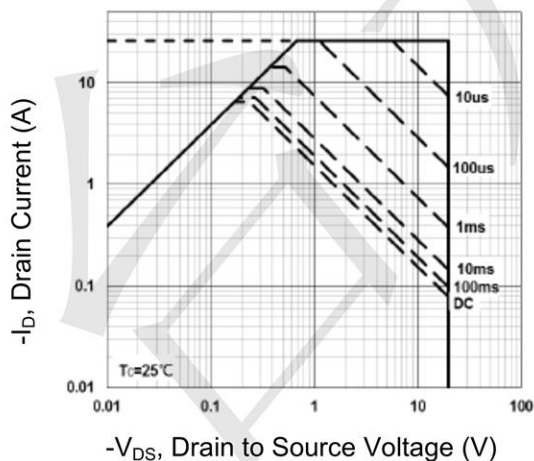

Gate Charge
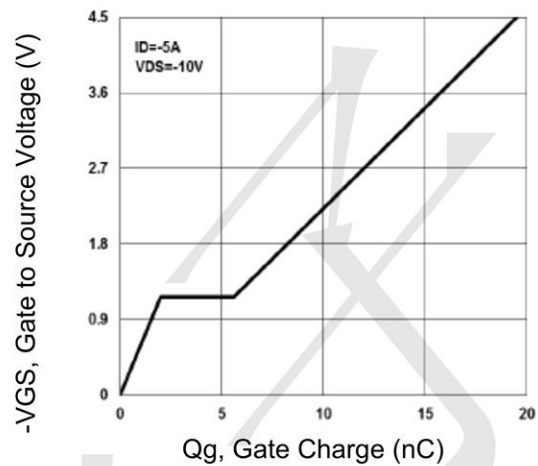
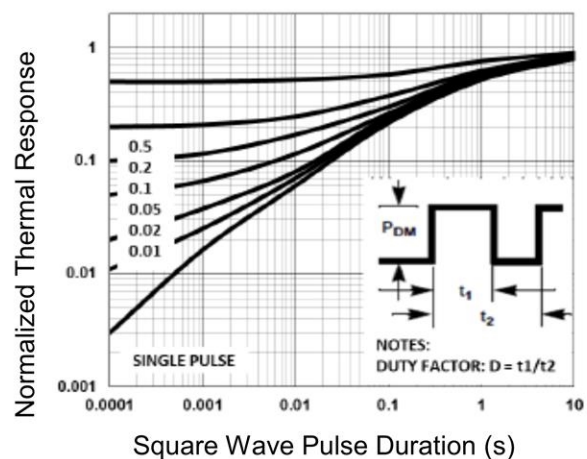
On-Resistance vs. Junction Temperature

Threshold Voltage vs. Junction Temperature
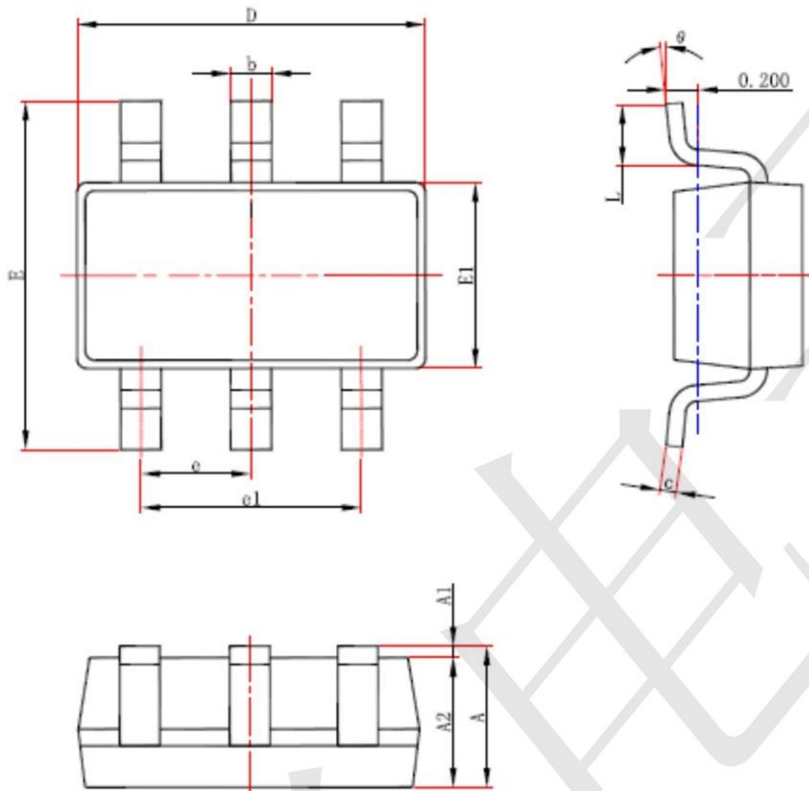

Maximum Safe Operating Area

Normalized Thermal Transient Impedance Curve

SOT163 Package Outline Dimensions

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°